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# Knitted Outerwear Times

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sweaters • swim suits • infantswear • knit fabrics • polo shirts • gloves • headwear

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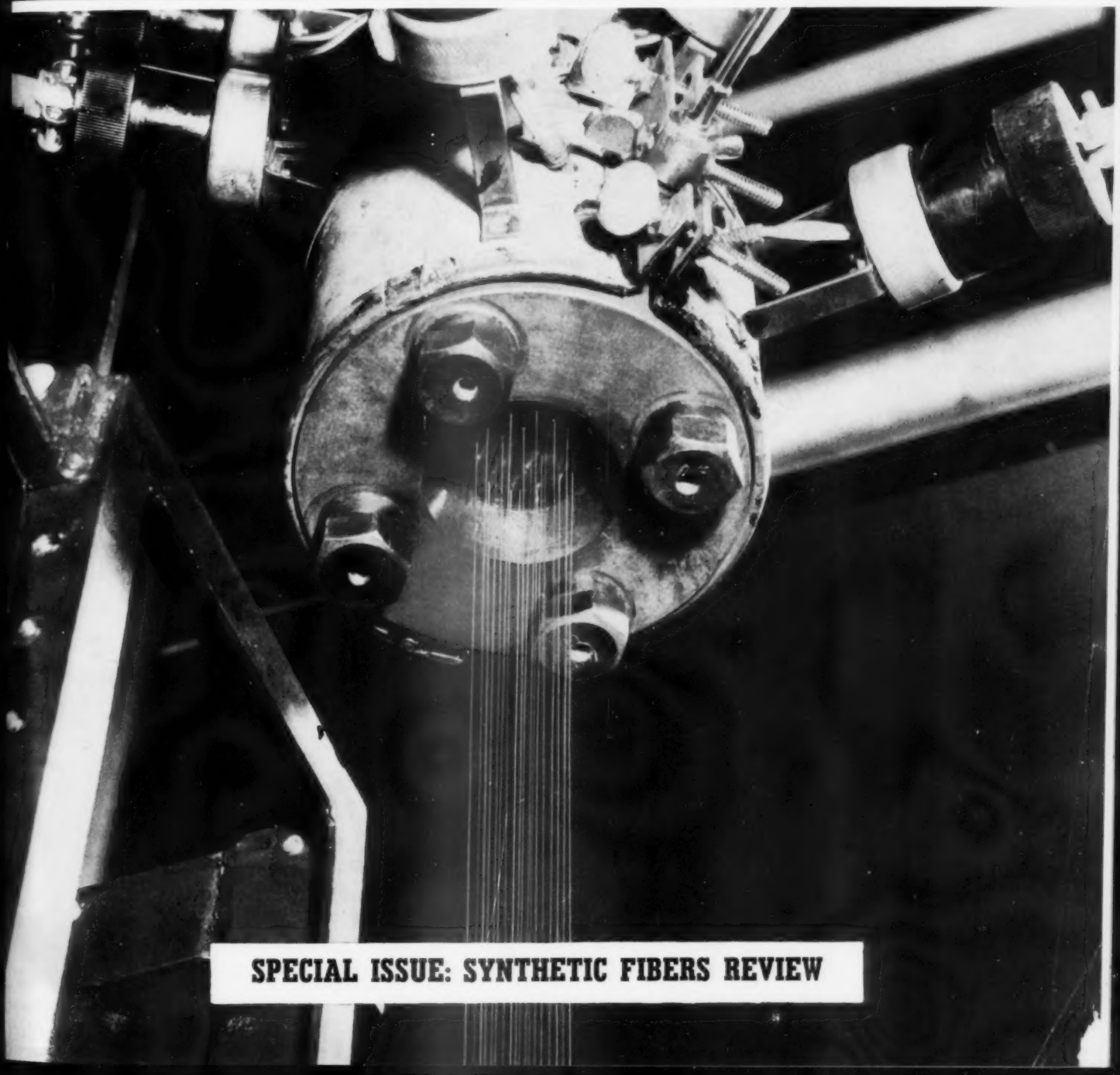
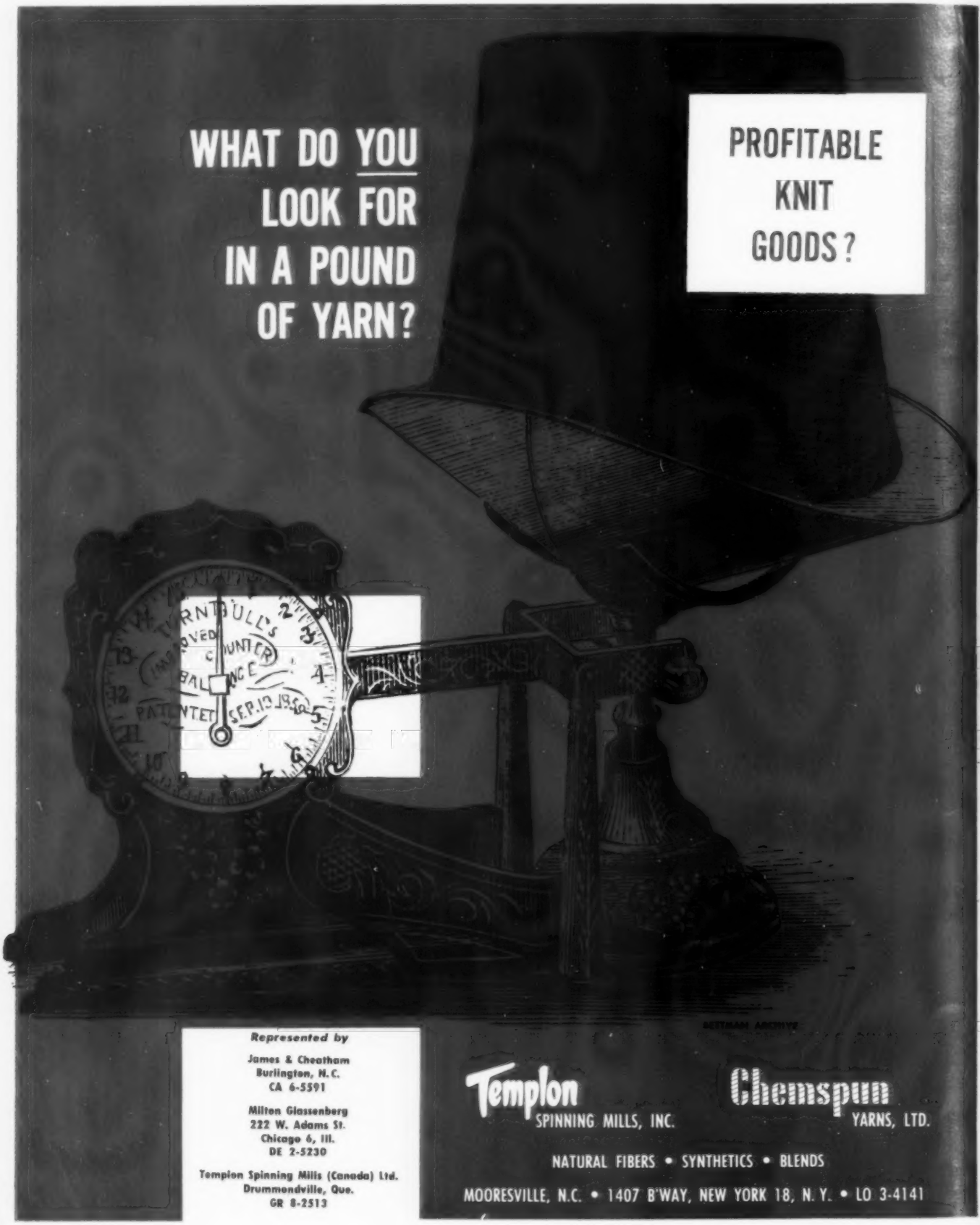


## SPECIAL ISSUE: SYNTHETIC FIBERS REVIEW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***Synthetic Fibers Review***

# Man-Made Fibers Lead In Knitted Apparel

By CHARLES REICHMAN, Editor

SYNTHETIC fibers continue to play a commanding role in the knitwear industry, despite a relatively strong resurgence of trade interest in wool and cotton. In the past year the consumption of synthetic fibers by the industry dipped slightly below the previous year. But this was a reflection not of reduced use of man-made fibers in sweaters, knitted fabrics and other products of the knitted outerwear industry but rather of curtailed production in virtually all knitwear product categories.

The past year's developments in man-made fibers suitable for knitted outerwear followed virtually the same pattern as in the previous year; that is, no wholly new commercially available synthetic fiber appeared on the trade scene, Instead, innovations were confined solely to further proliferation of fiber types to meet specific end-use requirements in knitwear and the related apparel and textile fields.

In the development of these new fiber types, a trend to the construction of so-called profiled fibers has become evident. Profiled fibers are those embodying other than the conventional round and elliptical cross-sections. Antron tri-lobal nylon and Cadon multi-lobal nylon are examples of profiled fibers.

Among the significant new fiber types within existing generic classes of synthetic fibers which have appeared on the trade horizon since the last edition of this annual synthetics fiber review are the following:

- Two new members of the Orlon fiber family — Type 24 bi-component Orlon Sayelle and Type 44 acid dyeable fiber.
- A new variety of Zefran, Type 1207, for blending with wool.
- A new type Creslan acrylic fiber said to be eminently suitable for knitwear.
- Two new multi-filament modacrylic fibers.
- A polyester base synthetic elastomer.

The past year also saw the inception of commercial production of a polypropylene fiber for textiles. The significance of this development for the knitted outerwear industry, however, is not yet apparent and may not become clear for some time.

**Acrylics**—Acrylic fibers probably represent the most intensely competitive segment of the synthetic fiber industry. This is only natural since there are now four acrylic fibers—Acrilan, Creslan, Orlon and Zefran—in commercial production, and plans are afoot for the introduction on the domestic market of at least one and possibly two foreign-made acrylic fibers.

The highly competitive character of the acrylic fiber business was sharply pointed up last month when the existing price schedules for three of the fibers underwent sharp downward revision. In some deniers prices were slashed nearly 10 per cent. Since its introduction in 1953, Orlon has come down in price almost 40 per cent. The price of Acrilan in its eight years of existence has nosedived as much.

As competitive pressure among the four fibers continues to build up with growth in plant capacity for the newer acrylics, further price cuts may be in the making. Swelling imports of foreign-made acrylic fibers and stepped-up dumping on the market of so-called sub-standard acrylic fibers will also exercise a severely unsettling influence on the already shaky price structure for acrylic fibers.

ACRILAN—Despite the intense promotional efforts undertaken in its behalf almost from the start, the Chemstrand Corporation's acrylic fiber has thus far failed to garner a spot for itself in the sweater industry. In knitted yardgoods, Acrilan has met with somewhat greater success than in the sweater field, but here too its acceptance has been on a limited basis. At present, use of Acrilan in tubular knitted fabrics is confined to a handful of resources, one of whom is said to account for nearly 80 per cent of the Acrilan knitted fabric business.

In an effort to win a place in sweaters for Acrilan, the Chemstrand Corporation recently took the unusual step of purchasing a substantial interest in a big name sweater firm. The unique move was made to provide the fiber producer with a ready-made vehicle for bringing sweaters of Acrilan to the attention of retail buyers as a first step toward winning long-sought consumer acceptance of the fiber in sweaters. Up to now, the company readily admits, it has found it difficult to place Acrilan sweaters on retail counters in any significant volume.

Chemstrand's move has clearly puzzled not only competitive fiber producers but many yarn spinners and sweater manufacturers as well. The general feeling in the trade is that, daring as the move is, it could prove more damaging than helpful to Acrilan's chances in the sweater field. For some sweater knitters the fact that Chemstrand is now allied with one of their competitors is regarded as a greater obstacle to their use of the fiber than has been the case up to now. Soundings taken among a representative sampling of sweater manufacturers discloses these basic objections to doing business with a fiber producer owning a substantial interest in a sweater firm:

- Fear that the sweater firm with which Chemstrand is allied will enjoy lower prices for Acrilan and thus be in a position to undersell other companies in the field.
- Belief that the greater percentage of Chemstrand's advertising and promotion funds, heretofore available to all takers, would now be doled out, with the greater proportion going to Chemstrand's sweater unit.
- Expectation that new fiber developments would not be made generally available by Chemstrand but confined, at least in the initial stages, to its own sweater company.

Yarn spinners reactions were less sharp than those of the sweater manufacturers. It is significant, however, that only a minority of those queried saw the tie-up with the sweater firm as presenting no road block to sale of Acrilan to competing knitters; the majority felt it would be a sales drawback.

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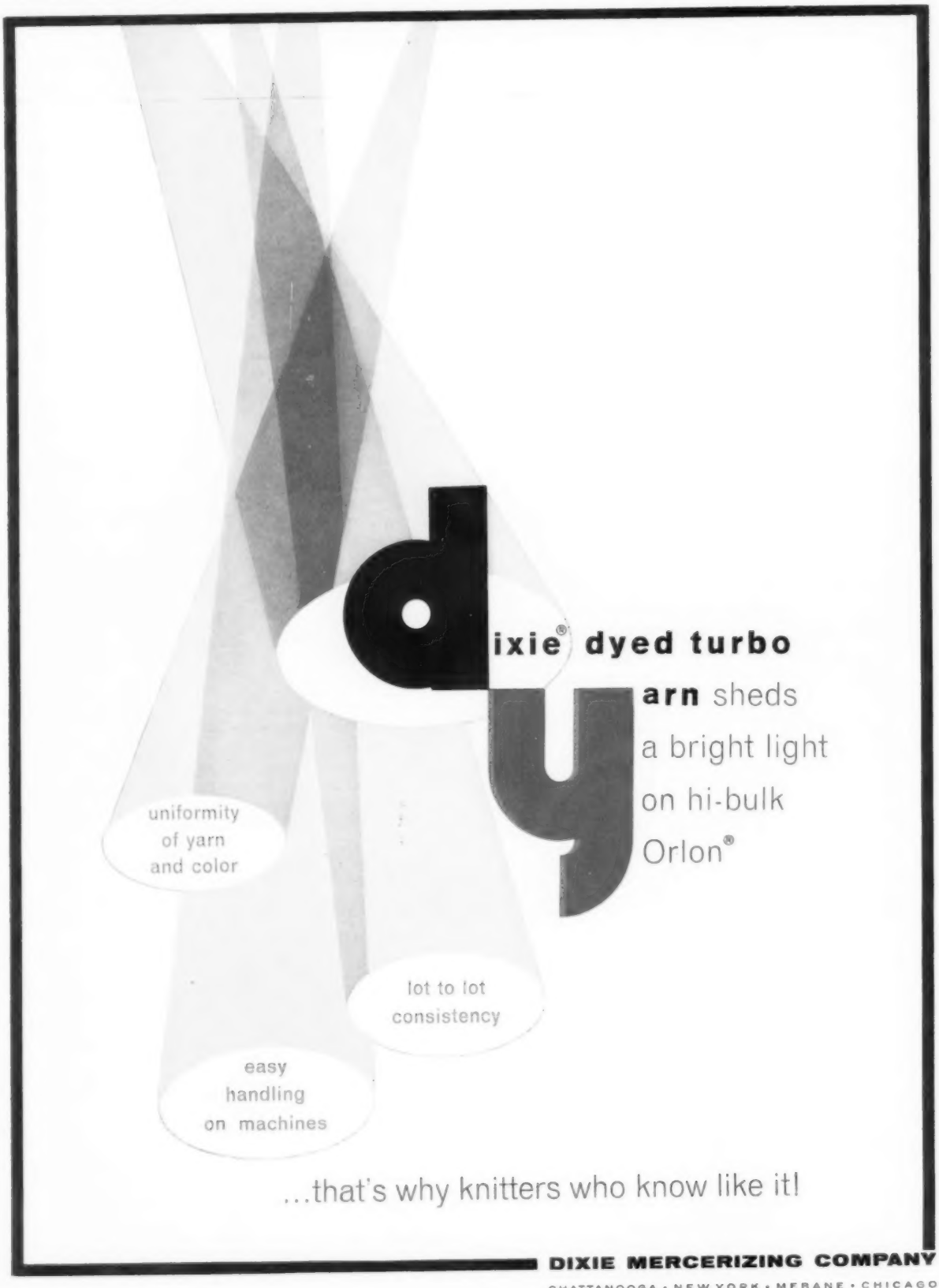
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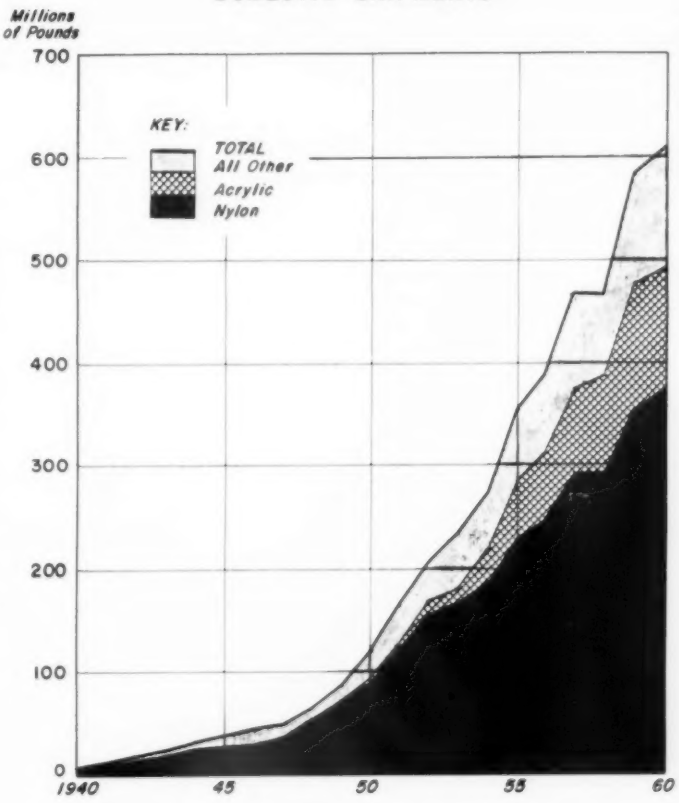
CRESLAN — Desipte the increased promotional effort that has been mounted behind Creslan, the American Cyanamid acrylic fiber still occupies a relatively minor slot in the knitted outerwear industry's fiber lineup. Use of Creslan currently is confined to a handful of sweater, sport shirt and yardgoods knitters. The fiber is being employed chiefly in blends with other fibers —in combination with textured nylon in full-fashioned sweatershirts; in an equal proportion with a new cross-linked rayon in a cut-and-sew knit shirt; in a blend with 22 per cent rubber and 11 per cent cotton in swimwear; and in varying percentage mixtures with wool for double knit fabrics.

The fact that Creslan has not been available in tow or high shrinkage staple form has been a serious obstacle to its more widespread utilization by sweater and yardgoods knitters. With the appearance, later this month, however, of a new Type 61 Creslan staple and tow, the fiber's prospects in knitwear will no doubt improve. The new Creslan fiber type means that now high-bulk yarns can be produced. Since the new Type 61 has an affinity for only basic and disperse dyes, it can result in cross dye effects in blends with Type 58 Creslan, the original Cyanamid fiber type.

ORLON—Of the four acrylic fibers now commercially available to the sweater and knitted yardgoods industry, Orlon is far and away the most important. Whereas all the other acrylic fibers together probably account for no more than 10 per cent of the industry's total fiber consumption, Orlon at the last countdown, went easily into 40 per cent of the industry's production of sweaters of all types.

Orlon's greatest strength is in women's, misses' and children's sweaters, and weakest in men's sweaters. In 1960 Orlon was the basis of more than 60 per cent of women's, misses', and children's sweaters produced in that year. However, in men's and boys' sweaters it accounted for about 25 per cent of all sweaters in the two categories knitted that year. Orlon's proportion of 1960 men's and boys' sweater output was down slightly from the proportion it accounted for of 1959 production.

U.S. NON-CELLULOSIC SYNTHETIC FIBER DOMESTIC SHIPMENTS




Aside from the fact that it was the first acrylic fiber to penetrate the knitwear field, a major factor underlying Orlon's dominance in knitted outerwear has been the ability of the Du Pont Company to produce the fiber in a steadily widening variety of types, each suited for a specific or limited number of end-uses. The so-called family of Orlon fibers now consists of 14 members, two of which — Type 24 and Type 44 — became commercially available early in the year. The family may have been one larger had not the DuPont Company withdrawn from the production of Type 82 Orlon, a continuous filament yarn designed for texturizing. As a textured yarn Type 82 Orlon was designated by the Orlon Cantrece trade mark.

Although Type 42 Orlon is still, in terms of volume, the major fiber in the DuPont acrylic fiber line, the reception being accorded in trade circles to Orlon Sayelle gives rise to the belief that in time the bi-component fiber may replace the older type as the chief raw material of the outerwear knitting industry.

In comparison with Type 42, Orlon Sayelle possesses a number of advantages. In knitted form it produces a fabric or garment which is more wool-like in appearance and texture and far loftier and more resilient. Moreover, it can be processed at the worsted spinning level in a more direct way than Type 42 Orlon. To convert Type 42 Orlon into high-bulk yarn, processing via the Turbo Stapler route is required. Orlon Sayelle, however, because of its inherent crimp, can be processed on the less complicated Pacific Converter.

At present, DuPont has only two Orlon Sayelle fiber types available — Type 21 and the more recent Type 24. The latter, which is available only in three denier, is designed for fine gauge knitwear; the former for bulky knits. Acceptance of the new Type 24 Orlon Sayelle has been somewhat slower than Type 21, due in part to the fact that production conditions are somewhat more critical than for Type 21, if pronounced pilling is to be avoided.

As in the case of Type 24 Orlon Sayelle, trade use of the other relatively new fiber — Type 44 acid dyeable staple — has been rather limited up to now. The fiber was developed largely to fill whatever trade demand existed for an acrylic fiber capable of being blended with Type 42 or other Orlon fiber types to produce contrast color effects either on a yarn or piece dyeing basis. In introducing Type 44, DuPont obviously was seeking to forestall any shift to the use of Acrilan 16, the Chemstrand contrast-color fiber when combined with the older Acrilan 16.56.

ZEFRAN—Zefran in its third year of production, still remains a minor fiber for knitted outerwear. There is no known application of Zefran in sweaters in 100 per cent form; whatever utilization has been made of it thus far has been in the form of blends with flax, wool or Rhovyl, a French polyvinyl chloride fiber.

Development of a Zefran-wool blend is of relatively recent origin and stems from the introduction by the company of Type 1207 Zefran, specifically designed for blending with the animal protein fiber. The desirability of a Type 1207 Zefran/wool blend for sweaters and knitted yardgoods still remains, however, to be tested out at the consumer level.

Like Creslan, Zefran suffers from the fact that it is not only in limited production but is not commercially produced in tow or high shrinkage staple form. The latter means that it cannot be converted into a high-bulk yarn and thus meet competition with Orlon. The fact too that, like the other acrylic fibers, it does not offer the knitter properties much different from those of Orlon is regarded as another strike against it.

**Cellulosics** — Until the appearance of some of the new high wet modulus rayon fibers such as Avril and Moynel, and the new cross sectional rayon fibers such as Corval and Zantrel Polynosic, cellulosic fibers had largely been employed in the sweater trade as adulterants in blends with other, more expensive fibers. With the specially engineered rayon fibers, however, new opportunities for rayon in knitted outerwear have been

(*Continued on Page 7*)

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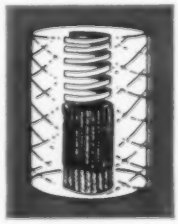

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opened up—in some cases in blends with other fibers, especially cotton, for sport shirts and dresses and in other instances in 100 per cent form.

Consumption of cellulosic fibers by the industry, although due for some increase in the next year, is not expected to rise much beyond the relatively low level of the past few years, except possibly in the triacetate fiber category where Celanese's Arnel is being looked at as a good candidate for blending with acrylics in sweaters and where it can be used in double knit fabrics in combination with wool or cotton or other synthetic fibers.

**Modacrylics**—The major domain of modacrylics almost from their inception has been the high-pile knitted fabric field. At no time have modacrylics been employed on any commercial scale to speak of in sweaters, knit shirts and tubular knitted yardgoods. The immediate outlook is for a continuation of this trend, despite the valiant efforts being made to find a spot for Dynel and Verel in the knitted outerwear field.

AERESS — Newest development in the field of modacrylic fibers is Aeress, a filament yarn product of Union Carbide & Chemicals Company which turns out Dynel staple and tow. Aeress, like Dynel, is produced from a mixture of polyacylonitrile and vinyl chloride. It differs, however, from the parent fiber in that it has a higher acrylonitrile content.

Current production is on a limited basis and is designed primarily for evaluation purposes. Whether it is applicable to knitted outerwear and can successfully fill the need which the trade had hoped Type 82 Orlon Cantrece was designed for, remains to be seen. Aeress in its initial experimental stages was designated as Fiber T. As such it had been evaluated by at least one full-fashioned knitter as a candidate yarn for silk-like sweater-shirts.

Aeress is priced from $1.95 to $2.10 a pound, depending upon the denier. It is produced in four sizes, 75 denier, 30 f.p.d.; 100 denier, 40 f.p.d.; 150 denier, 60 f.p.d.; and 200 denier, 80 f.p.d. Orlon Cantrece was produced in only one size, 200 denier, 80 f.p.d.

DYNEL — Blends have been the major avenue of investigation for the knitwear applications of Dynel. The Carbide and Carbon acrylic fiber has been combined with natural and synthetic fibers. One promising blend that has appeared on the market recently consists of 50 per cent dope-dyed Dynel, 40 per cent wool and 10 per cent mohair.

VEREL—There is no known use of Verel, Eastman Chemical Products' modacrylic, in knitted outerwear. Some evaluations, however, are known to be under way but there is no indication as yet as to their promise. A Verel textured filament yarn was placed on the market several months ago but it has no application to knitted outerwear, being designed for the carpet trade. It is offered in 2700 denier in natural and five solution-dyed colors. The solution-dyed yarn is priced at $1.20 a pound; the natural color yarn at $1.00 a pound.

**Nylon**—No major change in nylon's position in knitted outerwear has occurred in the past year. The fiber's major market is still sweaters and sweater-shirts knitted of textured filament yarn.

As is well known, there are two types of nylon in use—nylon 66, produced from hexamethylene diamine and adipic acid and so named because each con-

(*Continued on Page 9*)

## SPINNING SYSTEMS USED IN MANUFACTURE OF SYNTHETIC FIBERS

| Spinning System | Description | Fibers Produced |
|---|---|---|
| Melt | The melted polymer as it is extruded from the spinneret is solidified by chilling or cooling. | Dacron, DuPont nylon, Chemstrand nylon, Caprolan, Perlon (nylon 6) Rilsan (nylon 11), Terelyene, Kodel. |
| Wet | Fiber solution is forced through spinnerets under a so-called spinning bath. Coagulation of the viscous solution takes place as the thin filaments emerge in the liquid atmosphere. | Acrilan, Ardil viscose rayon, Darvan, polyvinyl alcohol fibers, Merinova, Zantrel, Zefran, Creslan. |
| Dry | The fiber solution is coagulated after emerging from the spinneret in a gaseous rather than a liquid atmosphere. | Acetate, Dynel, Orlon, Rhovyl, Arnel (triacetate), and Verel. |

## TYPES OF CYANAMID (CRESLAN) ACRYLIC FIBER

| Type | Description | Deniers | Staple Length | End-Use |
|---|---|---|---|---|
| 58 | Regular acrylic staple. | 2.0, 3.0, 5.0, 15.0. | 1½, 2, 2½, 3 3½, 4, 4½ inches | Knitwear and other apparel. |
| 61* | New staple and tow. | Not available | Not available. | Knitwear and other apparel. |
| WM | Woolen system blend fiber. | Average 4 denier per filament. | Variable cut lengths. | Apparel. |
| BB | Semi-dull | 3.0, 5.0 | Variable cut lengths. | Blankets. |
| BC | Cotton system staple. | 2.0, 3.0 | 1, 1½ inches | Apparel. |
| ** | Semi-dull staple. | 15.0 | 4 inches | Broadloom carpets. |
| ** | Bright staple. | Blends of 3.0, 15.0 deniers. | 2 inches | Deep pile rugs. |
| ** | Bright staple. | 5.0 | 3 inches | Area rugs, bath mats. |

*Fiber type will be introduced on Nov 30, 1961
**Undersignated modifications of type 58 fibers

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tains six carbon atoms, and nylon 6 which derives its name from the six carbon atoms in caprolactan, its basic building block.

Of the two types, nylon 66 is far and away the most important in terms of consumption. However, nylon 6 is looming up not so much as a substitute for nylon 66 but rather in combination with it to achieve interesting cross-dye effects. When the two are combined nylon 66 tends to dye a somewhat lighter shade than nylon 6.

NYLON 66 — Probably the most significant development in the area of polyamide fibers for sweater knitters is the introduction of profiled nylon fibers. At present there are two such fibers on the market, Antron tri-lobal fiber, a product of the DuPont Company, and Cadon multi-lobal fiber, produced by The Chemstrand Corporation. Of the two, Antron appears to have created the greater stir in the market. It is not only used in fine gauge knits but also employed in textured bulky knit sweaters.

NYLON 6—The chief nylon 6 fiber available to sweater knitters up to now has been Enka nylon. Now however, sweater and yardgoods knitters also can choose Caprolan, Allied Chemical's nylon 6 fiber. Caprolan, which formerly was produced only in coarse deniers for carpets, upholstery and drapery fabrics, is now being manufactured in deniers suitable for use on knitting machines.

TEXTURIZED NYLON YARNS—No change in the relative standing of the various processes for bulking filament nylon yarns for knitted outerwear has been evident thus far. Virtually all of the texturized filament nylon yarns used in sweaters and sweater-shirts are processed on the Ban-Lon crimping system.

The increased availability and broadened range of nylon filament carpet yarns that have been texturized, as it were, at the spinneret continues to give rise to the belief that eventually the technique would be applied to apparel denier filament nylon yarns.

Currently, both DuPont and Chemstrand are turning out producers' texturized nylon filament yarns for floor coverings. Recently, Chemstrand which markets its texturized carpet nylon yarn under the Cumuloft name, announced the introduction of a new yarn of this type.

**Polyesters**—Up to now polyester fibers have played a minor role in knitted outerwear and no change in their position is anticipated in the immediate future. This is in spite of the fact that the polyester fiber field gives every indication of becoming as competitive as the acrylic fiber area. Currently, there are four polyester fibers on the market—DuPont's Dacron, which was the first on the scene; Celanese's Fortrel; Eastman's Kodel; and Beaunit's Vycron. This line-up may shortly be increased with a polyester entrant from The Chemstrand Corporation. Chemstrand earlier in the year disclosed that it has been experimenting with such a fiber.

Major drawback to the use of a polyester fiber in sweaters, at least in spun yarn form, has been the synthetic's high tendency toward pilling. Some sweaters of texturized filament Dacron yarn had been available in the past but no major effort has been made up to now to market these sweaters in volume. For the present, the knitted outerwear applications of polyesters are confined to the fine gauge tubular jersey yardgoods field where the fibers are used in blends with cotton or with other synthetics.

The burgeoning double knit fabric field also may be a promising end-use area for the polyesters. Recently a double pique fabric of 60 per cent Kodel and 40 per cent wool appeared on the market.

Probably the year's most significant development in polyester fibers was the announcement three weeks ago by Eastman Chemical Products Co. that it is evaluating an elastomeric polyester fiber. The idea of producing an elastomeric yarn from a synthetic fiber is not new. The first efforts along these lines were made with nylon 66 in this country and with nylon 6 (Perlon) in Europe. Although successful elastomeric nylon yarns were produced, the products failed to measure up to natural rubber yarns in performance and quality. The work was thus dropped and emphasis

(*Continued on Page* 11)

# Types Of Acrilan Acrylic Fiber Staple And Tow

| Type No. | Description | Available Deniers | Staple Lengths | End-Use |
|---|---|---|---|---|
| 1656 | Regular staple and tow | 2.0, 2.5, 3.0, 5.0, 15.0 denier staple; 3.0, 8.0, 15.0 denier tow. | 1 9/16, 2, 2 1/2, 3, 4, 6 inch staple lengths. Tow bundles 3600,000, for 8.0 denier, 432,000 for 3.0 denier and 675,000 for 15.0 denier. | Deep pile fabrics; knitting yarns for sweaters, half hose, jersey knits, wool system blends; woven goods all types; carpets; upholstery yarns; also for medium fine fabrics. |
| 16 | Cross dyeable staple. | 2.0, 2.5, 3.0, 5.0, 6.5, 8.0, 15.0, denier staple and 2.0, 2.5, and 3.0 denier tow. | 1 1/8, 1 9/16, 2, 2 1/2, 3, 4 inch cut length staple. Tow bundles 400,000, for 2.0 denier, 480,000 for 3.0 denier, 600,000 for 2.5 denier, tow bundle denier. | Jersey yarns; men's wear fabrics; yarns for weaving and knitting; cotton spun fabrics; throw rugs, deep pile fabrics and blankets, denier. |
| Acrilan-Spectran | Solution-dyed | 2.5, 3.0, denier. | 2 inches | Blends for flannel type fabrics; half hose. |
| 77 | Variable cut staple. | 3.0, denier. | Random cut lengths. | Pile fabrics. |
| 88 | Variable cut staple. | 3.0, denier. | Random cut lengths. | Blankets. |
| 89 | Variable cut staple. | 5.0 denier. | Random cut lengths. | Blankets, woolen system blends. |

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shifted to the development of spandex elasticized yarns produced from polyurethane.

Complete details on Eastman's polyester elasticized yarn are not yet available. However, initial reports indicate that its degree of elasticity is of a higher order than spandex fibers. The new Eastman elastic fiber, formerly called T-1700, has good resistance to chlorine type bleaches and has a high degree of resistance to heat degradation. The fiber is dyeable with disperse dyes.

**Polypropylene** — Polypropylene is a bright new star on the synthetic fiber horizon but its potentialities as a knitted outerwear fiber have yet to be ascertained. Thus far, use of polypropylene has been limited to such industrial end-uses as outdoor furniture covers and auto seat covers, but a number of companies are known to be evaluating polypropylene in staple form. One such company is Hercules Powder Company, whose polypropylene fiber plant at Covington, Kentucky, went on stream two months ago. The fiber being extruded at the Covington plant comes in 3.0, 6.0 and 15 denier staple, and 120 and 165 denier multi-filament yarns. Hercules has trade marked its polypropylene fiber, Prolene.

Chief drawback of polypropylene fiber is its resistance to dyeing. This stems chiefly from its inertness and extremely low rate of moisture absorption. Polypropylene's moisture regain is 0.15 compared, for example, to 4.2 for nylon. In attempting to dye polypropylene a number of procedures have been worked out such as carrier dyeing and techniques involving fiber modifications but to date no satisfactory dyeings in terms of acceptable wash and light fastness have been possible. Moreover, dyeings via conventional procedures have proved highly time-consuming and costly. Until a satisfactory method of dyeing polypropylene conventionally is worked out, the fiber is being colored by injection of pigments in the fiber-forming solution prior to extrusion. But even this technique has raised some problems due largely to the fiber's heat sensitivity.

Despite the difficulties that are being encountered in dyeing it, polypropylene enjoys a number of advantages as a textile fiber.

## TYPES OF ZEFRAN ACRYLIC FIBER

| Type | Description | Deniers | Staple Length | End-Use |
|---|---|---|---|---|
| 1203 | Original staple for blending with linen and cellulosic. | 2.0, 3.0 and 6.0 deniers. | 2.0 denier comes in 1½", 2" and 3"; 3.0 and 6.0 deniers in 1½", 2", 3", and 4½". | Apparel, including sweater and knit shirts. |
| 1207 | Staple for blending with wool and other fibers. | 2.0, 3.0 and 6.0 deniers. | 2.0 denier comes in 1½", 2", and 3"; 3.0 and 6.0 denier in 1½", 2", 2½",3" and 4½". | Apparel, including sweater and knit shirts. |
| W 7 | For blending on woolen system. | 2.5 denier. | Variable staple length. | Apparel, other end-uses. |
| W 9 | For blending on woolen system. | 4.5 denier. | Variable staple length. | Apparel, other end-uses. |

One of these is low cost. Hercules is selling three and six denier staple and tow for 90 cents a pound. This compares with $1.18 for three denier Orlon. Actually, it is believed that once the fiber meets with commercial acceptance, its cost could be scaled down considerably lower. One figure being quoted is as low as 55 cents a pound.

A further advantage enjoyed by polypropylene over existing fibers is its low specific gravity. In end-use terms, this means the fiber has high covering power and light weight. Thus, at a given weight less polypropylene fiber has to be used to achieve the covering power attained with another synthetic fiber of higher specific gravity. This factor alone could also be a substantial cost saving.

Basic raw material of polypropylene is propylene, a product of the petrochemical industry. The basic raw material is in good supply and presents no conversion problem.

At Hercules and other polypropylene producing companies, evaluations of the fiber's aptitude to knitted outerwear have high priority. No marked advances have as yet been achieved in the application of the fiber to the industry's products. However, the initial studies indicate that it has potentialities in knitwear in blends with other fibers as well as a textured filament yarn. The next two years may prove its value to the industry.

**Polyvinyl Alcohol Fibers** — The prospect, first held out last year, that the market by this time would see a polyvinyl alcohol fiber ready for commercial evaluation has since dimmed. The Air Reduction Corporation, which undertook an evaluation program on Airco Vinal reportedly has scrapped its plans to manufacture the fiber on a commercial basis.

Despite this, PVA fibers cannot be completely discounted for they possess properties that closely approach those of the natural fibers and, in addition, are quite versatile in their processing characteristics. Moreover, PVA fibers have the advantage of being quite inexpensive to produce. The question as to their commercial value rests largely on whether they can add characteristics to knitted apparel not now provided by the existing fibers.

Although work on PVA fibers has been discontinued in this country, it is proceeding in Japan where these fibers were originally developed.

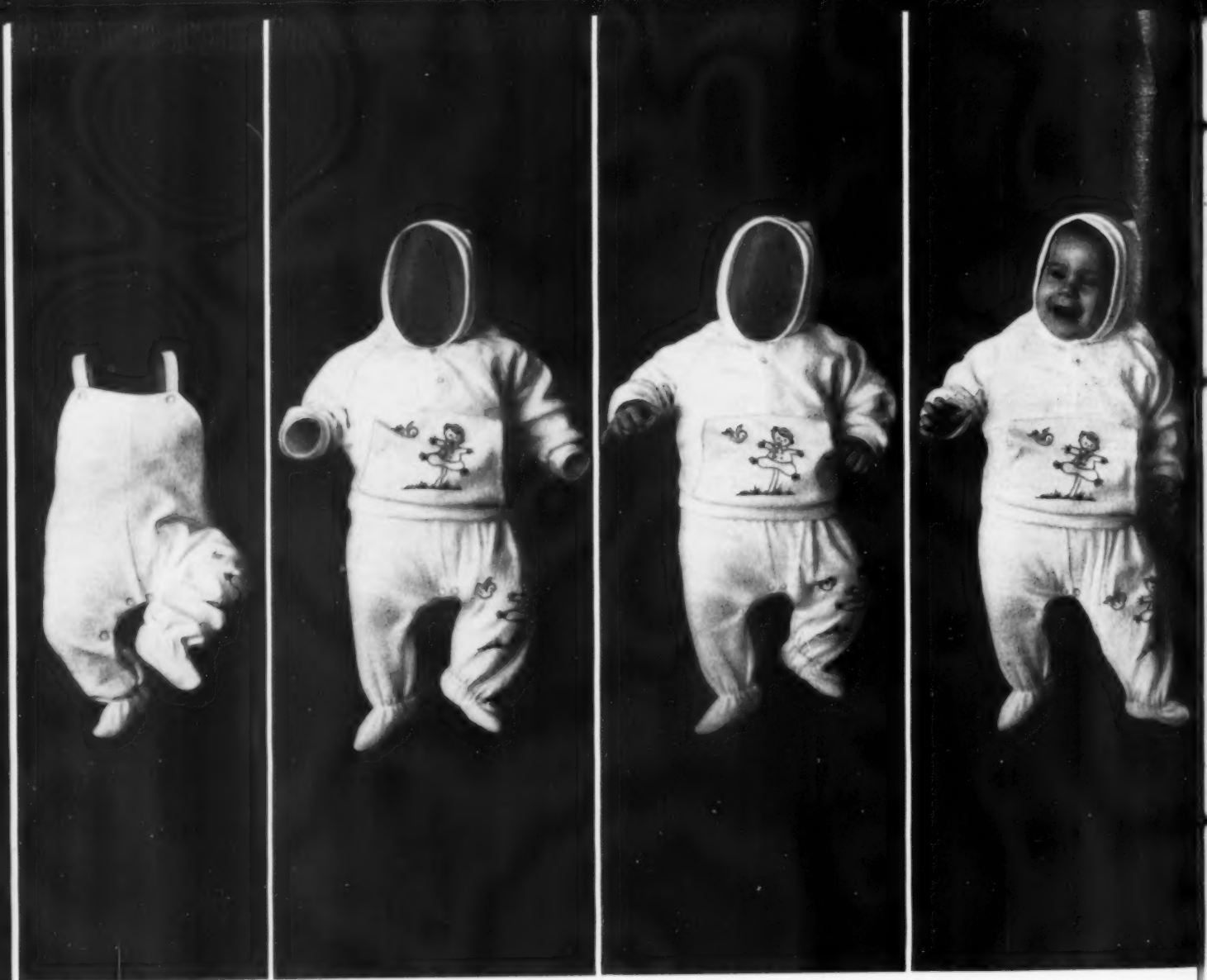
**Spandex Fibers** — Synthetic elastomers produced from polyurethane are a new and dramatic raw material for the swimwear section of the knitted outerwear industry. At the present time there are two such elastomeric yarns on the market—DuPont's Lycra and U. S. Rubber Company's Vyrene—but both are in extremely short supply. Only a handful of firms in the swimwear field have yet had an opportunity to use these fibers and those to whom they have been made available have received only small quantities.

The next two years should witness a marked increase in output of spandex yarns. In addition to the expanded production facilities for these yarns which will become operative at DuPont and U. S. Rubber Co., further supplies will be available from other resources. There are currently seven firms either planning to enter or already in the field of spandex fiber production. One of these companies, International Latex Corporation, which produces spandex fibers for its own use in foundation garments, expects to market the fiber on a direct sale basis next year.

Advantages of spandex fibers are their greater strength, stretch and resistance to stretching as compared to natural rubber thread. The latter two properties are especially significant for they mean that lighter deniers of yarn can be used, overcoming the "heaviness" of fabrics in which rubber has been introduced to attain elasticity. In contrast to natural rubber yarn, the spandex yarns can be used in either covered or uncovered form. Use of bare rubber is difficult because of its low chafe and abrasion resistance.

LYCRA — A multi-filament yarn, DuPont's Lycra is sold in 70, 140, 200, 420 and 560 deniers. 70 denier Lycra is equivalent to 250 gauge rubber thread; 560 denier Lycra to 90 gauge extruded rubber thread. Lycra is sold bare and it can be used in that form or covered with textile yarn.

VYRENE — Unlike Lycra, Vyrene is a monofilament yarn. The U. S. Rubber Co. sells it under its well-known Lastex trademark in nylon covered form. Vyrene comes in core sizes of 75 to 150 gauge.



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# Types Of Orlon Acrylic Fiber Staple And Tow

| Type No. | Description | Available Deniers | Staple Lengths | End-Use |
|---|---|---|---|---|
| 21 Sayelle | Bi-component fiber. | 3.0 and 6.0 denier staple and tow. | Variable cut length staple. Tow bundle 470,000 denier. | Women's and men's bulky knit sweaters and hand-knitting yarns. |
| 24 Sayelle | Bi-component fiber. | 3-denier staple. | 1-5 inch cut length staple. Average three inches. | For fine gauge sweaters. |
| 28 | Staple fiber | 8.5-denier staple. | 4 1/2 inch staple length. | For blending with Orlon and Orlon Sayelle knitwear styles and aesthics. |
| 33 | Staple fiber for blending with Type 38 tow in manufacturing of 2-height pile fabric of 100% Orlon. | 12-denier. | 2 inch staple. | Apparel. |
| 36 | Carpet staple fiber. | | 3 and 4 inches. | Carpets. |
| 38 | High-shrink staple and tow. | Mixture of deniers. (average about 3.0) Tow comes in 6.5 denier. | 1 1/4 inch staple. Tow bundle 630,000 denier. | For the manufacture of high-pile fabrics. |
| 39 | Woolen system staple fiber. | 4.2 average denier. | 2 1/10 average staple length. | Blankets and coatings. |
| 39A | Woolen system staple fiber. | 2.5 average denier. | 2 inch average fiber length. | Blankets and coatings. |
| 39B | Woolen system staple fiber. | 6.5 average denier. | 2 1/4 inch average fiber length. | Blankets and coatings. |
| 42 | Standard fiber staple and tow | 2.0, 3.0, 4.5, 6.0 and 10.0 denier. | 1 1/4, 1 1/2, 2, 2 1/2, 3 and 4 inches in staple length. Tow bundle 470,000 denier. | Sweaters, knitted yardgoods, other knitted and woven apparel items. |
| 42 Colorseal | Solution-dyed black staple and tow. | 3.0, 6.0 and 10.0 denier staple. | 1 1/4, 1 1/2, 2, 2 1/2 and 3 inches in staple length. | Sweaters, knit fabrics, other knitwear. |
| 44 | Acid dyeable staple and tow. | 3.0 and 6.0 denier. | 1 1/2, 3 and 4 1/2 inches in staple length. Tow bundle 470,000 denier. | Sweaters, knit fabrics, other knitwear. |
| 72 | Staple fiber with built-in fluorescent whiteness for blending with cotton. | 1.5 denier | 1 1/2 inch staple length. | Knit sport shirts, knitted yardgoods and underwear. |
| 75 | Cotton/rayon system staple fiber. | 2.5 denier | 1 1/2 inch staple length. | Heavier types of rayon and cotton blend fabrics. |
| 82 Cantrece* | Continuous filament yarn. | 200 denier, 80 filaments per denier. | | Used generally in sweater and sweater-shirts in textured yarn form. |

*Soon to be withdrawn from production.

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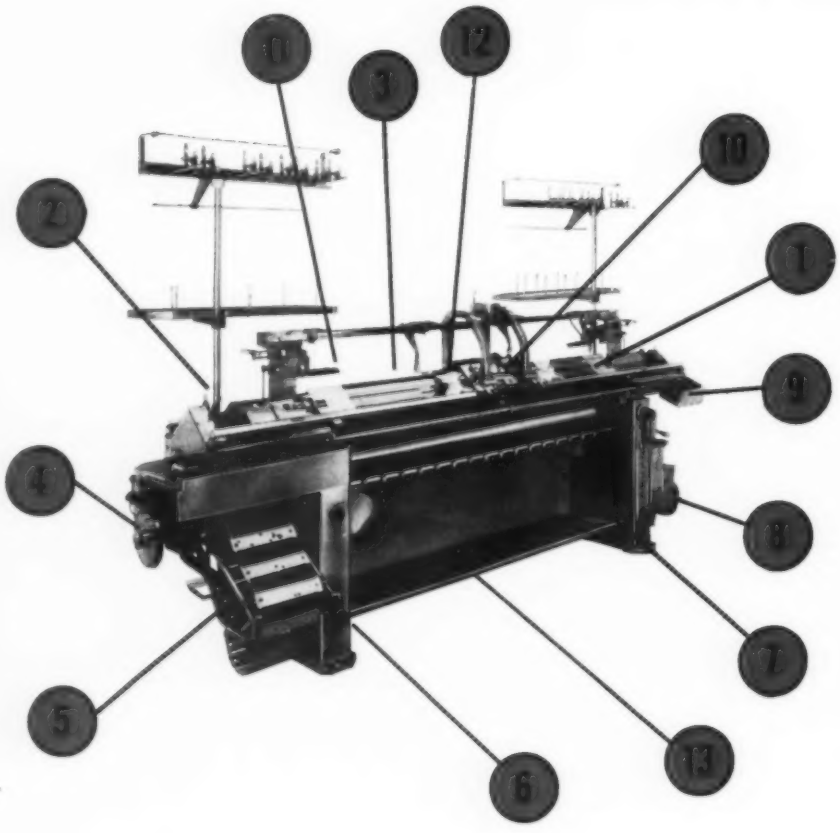


1. Front and back needle beds equipped with high and low needles and high and low jacks to vastly increase the pattern possibilities.
2. Internationally patented "fall away flappers" move slightly when carriage comes in contact with them. This acts as a cushioning device and decreases wear and tear on parts.
3. Large drive wheels increase speed to over 19 rounds per minute without vibration.
4. Counting disc acts as an economizer which saves the use of cards for patterns that are repeated.
5. Pasteboard card system makes all changes possible on either end. All pattern changes can be made, quickly, cheaply, and efficiently.
6. Tension on takeup is controlled by an adjustable spring which is equipped with a numbered dial that indicates the amount of tension being applied to takeup.
7. A series of small individually adjustable rollers which allows for even and safe drawing-off.
8. A 2-speed self-break electric motor. Break controlled by special electronic device.
9. Stopmotion control panel electrically indicates reason for machine stoppage.
10. Stitch indicators are numbered from 0 through 60 which makes adjustment on stitches easy and accurate. There is an indicator for the front and back carriage as well as one for each direction that the carriage is moving.
11. Needle protector is lifted out of action on either end of machine to prevent the possibility of it being activated by accidentally coming in contact with carriers that are not in use.
12. All changes are made by a double set of slide bars so that all positions can be accomplished on either side without presetting cams.
13. Fabric container attached to machine keeps fabric off the floor and clean.

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*Synthetic Fibers Review*

# New Fiber Type And Tow To Expand Creslan In Knitwear

BY GEORGE P. VESCIO
Manager Market Development,
American Cyanamid Company, Fibers Division

THE knitting industry has shown a growing interest and increasing use of Creslan, American Cyanamid Company's acrylic fiber, since it was first introduced three years ago. New yarns of 100 per cent Creslan, blends of Creslan with such established fibers as wool, cotton and nylon, and such new fibers as Corval, have provided a strong entry in the industry. On the way for 1962 programs, are new tow and staple fiber types specifically designed for high-bulk knitwear applications.

Extensive yarn and fabric evaluation has developed the wedge for a broad range of knitted end products. Based on performance, fashion and marketing innovations, knitting mills and manufacturers at the present time are offering Creslan in the following produce areas:

- Knitted outerwear
- Pile fabrics
- Hosiery
- Dresses and sportswear
- Sport shirts
- Swimwear
- Knitted deep pile area rugs

Creslan acrylic fiber has contributed to the acceptance of all new man-made fibers. Last year, the acrylics captured 19 per cent of the man-made fiber sales in the United States. The value of acrylics has more than doubled in the past five years to 116 million pounds. The forecast is for the market to double again by 1965.

This expansion—past, present and future—is the result of the textile industry's need for better performing fibers to serve consumer's growing demands for both fashion and ease of care merchandise. In this regard, Creslan, newest of the acrylic fibers, occupies a special position.

In fundamental terms, Creslan excels in its dyeing and hand characteristics and in the way it is merchandised. One of the principal objectives of the research which developed Cyanamid's acrylic fiber was to produce a fiber which would offer superior ease of dyeing, dye versatility and dye fastness. As a result, Creslan can be dyed with good fastness with a broader range of dyestuffs than any other acrylic fiber. Dyeing times are reduced because of the superior dye receptivity.

Creslan offers a physical structure which permits the dye to penetrate deep into the core of the fiber, assuring fastness and uniformity of color. With this superior performance, Creslan brings out the richness and depth of colors, and holds dyes through repeated washings.

Creslan possesses an unusually soft, warm and luxurious hand. Because of its light weight, it achieves outstanding bulk and body. It is high in dimensional stability, dries quickly after washing, has excellent resilience, so that it keeps its loft and texture in knit constructions, and it resists moth and mildew.

In addition to its specific fiber properties for knit goods, Creslan has a unique marketing and trademark program under which the fiber is being sold. To assist the manufacturer to achieve his profit potential, we have developed a quality and trademark control system. Under this program, the fiber is sold under the label, "Cyanamid acrylic fiber," not under the trademark "Creslan." Rights to the name Creslan are reserved for use only on those fabrics which meet clearly defined standards of performance and quality established by Cyanamid with the manufacturer. There are obvious great advantages to this approach in making Creslan a quality symbol in finished knit goods.

To insure future growth in order to better serve the knitting industry need for quality products, Cyanamid is pressing its research activities on a wide range of developments, including filament, tow, and new fibers.

Along with this pioneering work, Cyanamid continues to expand fabric development and designer services as part of its marketing operation to inform and assist knitting mills and apparel manufacturers. New opportunities are created via new fabric concepts, textural constructions, and style innovation directions with Creslan acrylic fiber.

It has been a fundamental objective of Cyanamid's Fibers Division to present fiber types to the knitting industry specifically designed for various knitwear applications. This effort is based on a broad research program and a careful evaluation at spinner, knitting and garment levels.

The primary aim in gearing up our marketing organization with knitting facilities to serve the knit goods industry is to reduce the amount of time required to translate new fashion concepts into profitable merchandise with consumer appeal. During the past year, the pace of this activity has quickened. Here are some of the developments for Creslan in knitwear during the past year:

- Development of new Type 61 acrylic staple and tow suitable for cross dyeing with present Type 58.
- Development of yarns for use in double knits.
- Introduction of the first Creslan terry cloth sport shirt, a 50/50 blend of Creslan and Corval.
- Development of blends for stretch fabrics in bathing suits.
- Deep pile fabrics for outerwear, emphasizing both texture and color.
- Hosiery programs of Creslan using blends with cotton and blends with wool.
- Underwear yarns of different weights in blends with cotton.
- Cooperation with machinery manufacturers to understand and evaluate the processing of yarns of Cyanamid's acrylic fiber on the latest processing equipment.
- Continued evaluation of high and low shrinkage staple.
- New blends with textured yarns for use in men's sport shirts.

The commercial development of a new whiter fiber, designated Type 61, is expected to have great significance in the knitwear field as it can be used to produce high bulk yarns. This development is expected to create heavy inroads into the sweater, knitted outerwear, hosiery and underwear fields.

Type 61 is dyeable with basic and disperse dyes, but is not receptive to acid dyes. In combinations with Type 58, cross dyeing of 100 per cent Creslan fabrics is possible to achieve a range of heather, stripe and patterned effects by piece dyeing. The new yarns, presently under mill evaluation, can be processed on a variety of spinning systems and in addition, can be used on Turbo Stapler and Pacific Converter equipment.

Commercial production is set to start January, 1962. Full technical information is scheduled to be announced this month.

## Callaway Produces Rug Of Knit Creslan-Verel

LA GRANGE, Ga. — Callaway Mills, Inc. is introducing Creslan acrylic fiber into its knitted fur-type Pom Pom scatter rug, a blend of 60 per cent Creslan and 40 per cent Verel, to be offered in 10 sizes and 14 colors in ovals, oblongs and rounds, with matching lid covers. They will retail from $4.98 to $32.98, depending on the size, which ranges from 18″ x 30″ to 52″ x 72″ in ovals and oblongs, and 24″ to 30″ in rounds.

The rug is said to be machine washable in warm water and to feature soil resistance and ease of care properties.

## 16-Page Ad Supplement On Creslan End-Uses

A 16-page supplement on products made with Creslan, American Cyanamid Company's acrylic fiber, appeared in the New York Times Sunday, October 29. The supplement has been issued annually since the introduction of Creslan in the fall of 1959. This year more than 170 manufacturers of textile products were listed.

A knit suit in shocking pink, a couture design by Milicent using a Fair-Tex Mills fabric, were featured on the cover. Featured were the division's current advertising theme.

Color is the name for Morgan

***Synthetic Fibers Review***

# Application Of Zantrel Polynosic Fiber To Knitwear

By CHARLES D. REICH
Hartford Fibres Company,
A Division of Bigelow-Sanford Inc.

ZANTREL Polynosic rayon has many characteristics that make it an outstanding new fiber for the knitwear industry. This clearly new development in the man-made fiber field is produced by the Hartford Fibres Company, a wholly owned subsidiary of Bigelow-Sanford, Inc., at its plant in Rocky Hill, Conn.

As a brief background the fiber has a history of discovery by the Japanese, pilot production by the Belgians, and limited commercial production in France, spanning a period of 20 years.

Ultimate refinement and volume production has been accomplished by Hartford Fibres Company, which began production in 1960. The unique characteristics of this product are achieved by radically new procedures in cellulosic fiber manufacturing costing several million dollars in new plant and equipment.

Basically, Zantrell is a fiber very similar to cotton in structure with long molecular chain lengths in fibrils with strong chemical bonds between them, compactly arranged. Old rayon has short molecular chain lengths in fibrils randomly arranged with fewer and weaker chemical bonds. This accounts for the fundamental difference between Zantrel and cotton, on one hand, as compared to old rayon in physical, chemical, and performance characteristics.

This structure results in the high wet strength of Zantrel and a stress strain curve very similar to cotton. Like cotton, Zantrel has lower elongation, higher initial modulus, lower water absorption and swelling, and higher elastic recovery than old rayon. These factors result in a high order of inherent dimensional stability, similar to cotton.

The principal item is 1.5 denier 1-1/4 inch and 1-9/16 inch. The market potential for this description is vast. One and three deniers are also available.

Zantrel is available in its natural luster. It has a subdued luster similar to the matt look of silk.

The fiber is readily processed on all conventional cotton or synthetic systems. Processing into yarn has proven to be a trouble free operation. I will not attempt to cover dyeing and finishing here except to say that Zantrel dyes like cotton with very slight differences in depth, depending on classes of dyestuffs and colors used. Colorfastness to light and washing is equal to cotton. Shade differences between Zantrel and cotton are no greater than the dyeing affinity of two different lots of cotton. As a result plant production people should have no concern regarding fly, contamination or specking with Zantrel in their plants.

The hand of knit fabrics containing Zantrel can be described as luxurious, dry, lofty, full, round, crisp. Hand is such a subjective matter that fabrics must be touched and handled to be appreciated. Certainly those individuals who are relied upon among mills, converters, knitters, and garment manufacturers for fabric selection have always been most enthusiastic about this aspect of Zantrel.

Very promising fabrics have been produced in plain jersey, interlock, and double knit in intimate blends with other fibers, such as Orlon, Arnel 60, and cotton.

A 50/50 blend of Zantrel/Orlon results in a double knit of excellent hand, piece-dyeing for unions or cross-dyeing, and optimum ease of care. Completely washable, the cloth has excellent wrinkle resistance and wrinkle recovery.

Zantrel and Arnel 60 will be in the stores for spring 1962 with one of the top brand names in a line of double knits for dresses, separates, and suits.

One of the outstanding volume uses for Zantrel is in blends with carded cotton. The fact that Zantrel in blends with carded cotton substantially upgrades fabrics — woven and knitted — is clearly apparent. An improvement in hand is one advantage. Cleanliness of fabric is another compared to 100 per cent carded cotton.

**A Talbott double knit dress in Zantrel/Arnel for spring and summer.**

Of particular significance now is the price of cotton versus Zantrel. Generally speaking the grades of carded cotton on a cleaned basis used in blends with Zantrel are equivalent in price to Zantrel today. The long range outlook is for further advance in cotton prices.

Further price advantages are more obvious in blends in the combed cotton and premium staple length cotton areas.

In knits, Zantrel has to date shown to best advantage in blends. A minimum of 40 per cent to a maximum of 55 per cent is recommended, depending on component blend fiber, fabric construction, and end use.

One of the important considerations to be aware of is that Zantrel, has a high comfort factor. Like a good grade of cotton it absorbs moisture and really evaporates it.

There is no pilling problem in Zantrel. In fact, it prevents pilling in blends with other fibers that normally have a pilling or fuzzing problem. Blends with wool also offer interesting possibilities.

## Du Pont Forms German Affiliate

DUSSELDORF, Germany—Du Pont de Nemours International S.A., of Geneva, Switzerland, will form a new, wholly owned German subsidiary company, Du Pont Chemie G.m.b.H., for the sale of Du Pont textile fibers in Germany, Thomas J. Milligan, managing director of Du Pont de Nemours International, announced.

The new German company, with main offices in Dusseldorf, will be responsible for the sale of Orlon acrylic fiber, nylon, Lycra spandex fiber, and other synthetic fibers developed and manufactured by Du Pont.; In addition, it will provide technical assistance, merchandising and promotion services to German textile fibers customers.

The decision to establish Du Pont Chemie G.m.b.H. follows an agreement between Du Pont de Nemours International S.A. and the Ernst Beck organization of Wuppertal-Barmen, sales representatives of Du Pont fibers in Germany since 1954. As a result of this agreement, Du Pont Chemie G.m.b.H. will take over the sales around the end of this year and most of the personnel of the Ernst Beck organization will be employed by the new German company. Ernst Beck will be a member of the board of directors of Du Pont Chemie G.m.b.H.

Charles D. Wenrich, marketing manager in the New York Office of the parent company's Textile Fibers Department, will be transferred to Germany as managing director of the new sales subsidiary. Mr. Wenrich has had over 16 years' textile fibers experience in sales and marketing of Du Pont fibers.

To meet the growing needs of European customers, a new plant, owned and operated by Du Pont de Nemours (Nederland) N.V., will soon begin production of Orlon acrylic fiber at Dordrecht, The Netherlands.

# Color is the name for Morgan

*Hercules and Tyros discover Tyrian Purple from a conch shell.*

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## COLOR SELLS WOMEN . . . and MORGAN SELLS COLOR

When the nymph Tyros begged Hercules for a robe dipped in the same wondrous purple that stained the dog's mouth — as he devoured a mollusk on that far-off Grecian shore — she really started something! And this same eternal feminine instinct for color that enhances a garment's desirability has kept men constantly developing new methods and materials to win woman's praise — and entice her selection among competing wares.

Today's gleaming miracles of stainless steel in the Morgan dyehouse work color magic Tyros never dreamed possible. Here men and machines daily turn out vast quantities of dyed yarns which put not just *any* color — but *identical shades*, lot after lot, at the knitter's profitable beck and call. It's part of the gigantic color merchandising movement, begun so long ago . . . now being ably aided and abetted to *your money-making advantage* by Morgan!

*Through Service We Grow*

**Skein dyeing • Package dyeing • Raw stock dyeing • Top dyeing • Tow dyeing**

# MORGAN

Morgan Dyeing and Bleaching Co., Inc. • Rochelle, Illinois

*ABOUT THE ILLUSTRATION ON THE OTHER SIDE OF THIS INSERT:*

*Reference material courtesy of Ciba Company Inc.*

*Painting by Claude L. Salisbury*

## WAS THIS THE BIRTH OF THE DYEING INDUSTRY?

According to Greek mythology, Hercules — for all his less-than-admirable traits — may have contributed toward the development of dyeing as an industry. One of the lesser gods, Hercules devoted much of his career to the pursuit and enjoyment of feminine associations. One of his companions, the nymph Tyros, strolled with him beside the sea one day and together they observed Hercules' dog nosing among the shells on the shore. In canine fashion, he crushed one of these between his teeth, and the brilliant purple color released so delighted Tyros that she begged for a robe of the same color — and Hercules, eager to win favor, hastened to oblige.

Here, our artist interprets the mythological scene: the sandy beach, with the blue Mediterranean waters stretching beyond, and a red sail disappearing into the sunset; in the left background, a temple of the Ionic architectural style which prevailed in pre-Hellenic Greece. The costumes of Hercules and Tyros are typical of the period . . . the plain white girdles wrapped about them, the leather thong sandals, the hair caught up by a band; the dog — a typical offspring of mixed ancestry, not much different from those of today. The conch shell was a type found there in abundance in ancient times; the purple was secreted in a single gland, and was obtained by the Mediterranean peoples simply by crushing the entire mollusk. Since it took thousands to produce the dye in any quantity, the color was considered extremely precious, and was therefore reserved for the robes of royalty and government dignitaries, and became a symbol of wealth and power. Apparently, no attempt was made to replenish the mollusk population, and the continuous destruction finally made the species virtually extinct.

Skein dyeing • Package dyeing • Raw stock dyeing • Top dyeing • Tow dyeing

# MORGAN

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*Additional copies available on request.*

*Synthetics Fiber Review*

# Knitting Fine Gauge Sweaters Of Type 24 Orlon Sayelle

By GEORGE D. NEAL
Technical Service Section, Textile Fibers Department
E. I. Du Pont de Nemours & Company

ORLON SAYELLE bi-component acrylic fiber incorporates a completely new concept never before achieved in synthetic fibers. This new product possesses a permanent and reversible spiral crimp which imparts excellent resilience, elasticity, cover, and loft to knit fabrics.

It has been long recognized that wool exhibits a high degree of bulk and compressional resilience, and that the behavior of wool is unique among natural fibers. Studies of wool have revealed that the protein structure of each of the fiber's two sides is slightly different and that this bi-component nature of wool is responsible for the crimp reversibility and crimp permanence of the fiber.

Like wool, the two sides of Orlon Sayelle fibers have slightly different chemical structures. To activate the built-in crimping potential, the fibers must be wet-treated at some point of manufacture for a minimum of 20 minutes at or above 205 degrees Fahrenheit (96 degrees centigrade). Atmospheric steaming will not be sufficient. The loft, bulk, and cover of goods made of these fibers develops from the self-crimping of individual fibers within the finished yarn bundle during relaxed drying and not in wet finishing. When the fiber is rewetted, a temporary reduction in crimp occurs. Recrimping will take place automatically as water is removed by drying. The crimp can be pulled out or removed mechanically during processing, winding and knitting, but it always returns during relaxed drying. As a result of this permanent reversible crimp property, knit goods of Orlon Sayelle bi-component acrylic fiber will reshape themselves each time they are laundered and will elimiate distortion induced by wear.

Orlon Sayelle Type 24, a recent supplement to the bi-component group of acrylic fibers, is designed to be used as a two-ply yarn for full-fashioned equipment would be 2/30's w.c., 11.0 Z turns per inch in the singles and 4.7 S turns per inch in the ply. Sweaters knit from yarns of this fiber have shown good resistance to pilling and surface distortion.

When knitting yarns of Orlon Sayelle, it is necessary to allow for fabric relaxation (bulk development and yarn shrinkage) in the wale direction. The following figures will indicate the approximate fabric relaxation that can be expected from skein-dyer, package-dyed, and greige yarns for piece dyeing:

**Fabric Relaxation**

| | |
|---|---|
| Skein-dyed | 15% —20 % |
| Package-dyed | 10% — 15% |
| Piece dyeing | 20% — 25% |

This represents a departure from the procedure used with dyed yarns of Orlon Type 42 acrylic fiber where all yarns except tow-dyed types are knit to size.

The bulking action in yarns of Orlon Sayelle bi-component acrylic fiber is achieved through crimp development of the individual fibers within the yarn bundle after a hot-wet treatment such as dyeing, followed by relaxed tumble drying. At some point of processing, the fibers must be treated at the boil, which is necessary to achieve maximum bulking action, complete shrinkage, and to insure dimensional stability.

The following finishing sequences are recommended for knit goods of Orlon Sayelle:

**Natural Yarns**
Knit
Dye (208°F.)
Extract
Tumble Dry (180°F.)

**Dyed Yarns**
Knit
Scour (120-130°F.)
Extract
Tumble Dry (180°F.)

It is most important to knit down sample swatches, when first knitting Orlon Sayelle yarns or when changing yarn lot numbers, to determine finished construction. A good guide post on 21 gauge with 2/30's w.c. yarn is as follows:

**Knit**
Natural 17w x 14c
Dyed Yarns 19w x 14c

**Finished**
25w x 16c
25w x 16c

These sample swatches cannot be relaxed by steaming on an open press as is the procedure for high-bulk Orlon Type 42 acrylic fiber. Greige fabrics must be subjected to the boil (208 degrees F.) while fabric knit from ingrain yarns may be scoured at 120 degrees F. to 130 degrees F., followed by relaxed tumble drying until completely dry to gain maximum fabric relaxation. Fabrics of Orlon Sayelle bi-component acrylic fiber should not be submitted to tension while partially wet as the crimping facilities of the fiber will be restrained and resulting fabrics will be lean or distorted. However, maximum bulk development is still possible through the reversible crimping action of the fiber under additional hot-wet treatment and subsequent relaxed tumble drying.

In most cases, the yarn size currently being used for high-bulk Orlon Type 42 acrylic fiber is a good starting point for developing fabrics of Orlon Sayelle. The bulking action in Orlon Sayelle can be restrained and can vary as yarn twist and knitting constructions vary.

An example of increase in yarn size or bulking action achieved is illustrated by the following measurements.

1. Original or spun count — 2/30's w.c.
2. When skein or package dyed and measured without tension in a relaxed state — 2/24.5's w.c.
3. When skein or package dyed and measured under tension on an extended basis — 2/28's w.c.

It is apparent that most of the bulk achieved occurs through crimp development. The above measurements of yarn size with and without tension best illustrate the outstanding elasticity obtained with yarns of Orlon Sayelle. The above yarn counts of the dyed yarns shown the extremes that could be encountered in yarn bulk. If a yarn were restrained by high twist or construction, the increase in yarn size would be slight. However, if the yarn is completely free to bulk, the increase is much greater. For this reason, no concrete rule can be given as to a specific yarn count for a wide range of knit constructions.

In the production of full-fashioned sweaters from Orlon Sayelle Type 24 bi-component acrylic fiber, rib trims can be knit either 1 x 1 or 2 x 2 and can be knit on any ordinary V-type flat machine. When knitting the fronts, backs, and sleeves, it is very important to obtain the same finished construction even if knit on different machines.

This is very important to eliminate any possibility of "puckering" in the finished garment because of non-uniform stitch construction.

The various parts of the full-fashioned sweater must be joined in looping and seaming with the same yarns as used in the knitting of the bodies and sleeves. This will eliminate any possibility of "puckering" during finishing and will conform to the automatic blocking concept of Orlon Sayelle bi-component acrylic fiber.

If ingrain yarns have been used to knit the sweaters, the following finishing procedures must be used to eliminate spinning, winding, and knitting tension effects and to achieve complete bulking.

1. Turn fabrics face inside if possible.
2. Bag goods for wet treatment.
3. Wet out fabrics thoroughly at 120 degrees F. for at least five minutes.
4. If soiled, the knit fabrics should be scoured in a tumble washer or paddle dryer at 120 degrees F. for 10 minutes with a 1.0 per cent detergent such

(*Continued on Page* 41)

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***Textured Filament Yarns***

# Opportunities For Textralized Yarn In Knit Outerwear

By HARRIS L. JOHNSON
Joseph Bancroft & Sons Co.

THE wide range of products which today successfully utilize Textralized yarns is proof positive that the early predictions concerning the yarn's versatility were correct. Garments made from this yarn cover the apparel range from lingerie to raincoats; they include men's and women's hosiery, foundation garments, men's underwear, lingerie, blouses, dresses, men's and women's sweaters, lace, sport shirts, gloves, and raincoats. The required surface textures for these applications vary in every instance.

The fact that Textralized yarn is used in those fields where once natural fibers were considered to be unassailable, is a further example of the astonishing development work that has been accomplished. Joseph Bancroft & Sons Co. and their licensees have greatly refined the art of crimping continuous filament yarn, not only in the ability to control the bulk level and uniformity of the yarn, but also from the standpoint of varying the hand and surface interest of any fabric which utilizes that yarn.

Let's review, for a moment, the basic characteristics of Ban-Lon products which have been made possible by the development of Textralized yarn. The characteristics of the raw continuous filament yarn are for the most part maintained, and the crimping of the yarn imparts such desirable features as resilience, warmth and insulation, moisture absorption, and comfort of certain natural fibers. The industry is familiar with the hand that has become synonymous with Ban-Lon products; however, the versatility of the crimping process seems to have no boundaries, and the ability to create yarns capable of being manufactured into fabrics with the surface interest and feel ranging from a soft cashmere to a crisp wool-like hand must not be overlooked.

The ladies' sweater industry, in its continuing search for new styling concepts, has been greatly encouraged after reviewing recent fabric developments by the Bancroft Company and its licensees. The versatility of the Textralized yarn, which is utilized in these samples, reflects the skill and enthusiasm which these companies offer the textile industry.

Space will not permit a detailed account of these samples; however, several have been chosen for a quick review. The equipment mentioned in these descriptions is, in fact, the equipment which was used in development. Here again, the versatility of the crimping process can be counted on to achieve essentially the same results on equipment which is of a different cut or gauge. Notice that each description illustrates a different surface texture effect and that each is made from 100 per cent Textralized yarn.

• A ten-cut Jacquard machine has been utilized to achieve a hand which is familiar to Ban-Lon garments, but unusual surface and color interest were achieved by using a single end of 1/200 dull nylon and a single end of 3/70 bright nylon in a rib stitch which combines cylinder needle and yarn selection to give a vertical rib effect.

• An exciting tweed effect in a simulated double-knit is the result when a 16½-cut interlock machine is set up with feed No. 1 carrying 1/200/34 nylon solution dyed black, feed No. 2 carrying 2/70/34 Dacron, and feed No. 3 carrying 2/70/34 nylon. The cone pattern is repeated around the machine. The recent fashion interest in fabrics of a double-knit construction has created an ever increasing interest in Textralized yarns for this end use. Fabrics which incorporate the qualities of a lively hand, comfort, controlled stretch, added bulk with less weight, and a high resiliency are a must for this newest of knitted yardgoods.

• Careful color selection will broaden a tone on tone effect to a clear distinct popcorn stitch definition, with a dry crisp hand, when accomplished through the use of two ends of 5/200/34/3½S in bright nylon and two ends of 5/220/50/3½S in Dacron on a four-cut links and links circular machine.

• A horizontal striping on alernate bands of half-cardigan and racked stitches offers an unusual colorful surface effect, with a slightly crisp hand, through the use of nylon in six ends per feed of 2/70/34/2½S of dyed Textralized yarn on alternate bands on a four-cut flat machine. Incidentally, the dyed yarn used in this sample is a product of the core crimper principle which affords dyed yarns which maintain the desired bulk level.

• An eight-cut links and links circular machine has been used to achieve a basket weave motif effect with dyed Textralized yarns in 3/200/68/3½S nylon. The hand is crisp and ideally suited for a sweater.

• A wool-like hand has been achieved on a 2½-cut flat machine which utilizes three cones of 3/200/32/2½Z type six nylon.

• A 16½-cut interlock, utilizing 2/90/26/200/2S nylon, dyed Textralized yarn offers an opportunity for fabric diversification to those manufacturers limited to interlock equipment. The use of this yarn produces a strong wool-like hand.

• An end product that closely resembles a mohair garment has been achieved on a four-cut flat machine through a half-cardigan stitch using a novelty Textralized yarn composed of two ends of 1/200/34 nylon and 1/70/17 nylon plied.

• Full-fashion equipment can produce garments, which offer a silk-like hand, a cashmere-like hand, and a crisp wool-like hand by utilizing Textralized yarn which has varying bulk levels and various deniers per filament.

One of the most exciting areas of the broadly diversified development activity which is currently underway is the study of the aesthetic and performance values on various knitting equipment of the effect of denier per filament. Briefly, the premise of the studies can be said to closely parallel the wide range available in wool yarns in that an increase in denier per filament coupled with changes in the crimping process changes these values from a silk-like hand to a crisp wool-like hand with corresponding changes in performance.

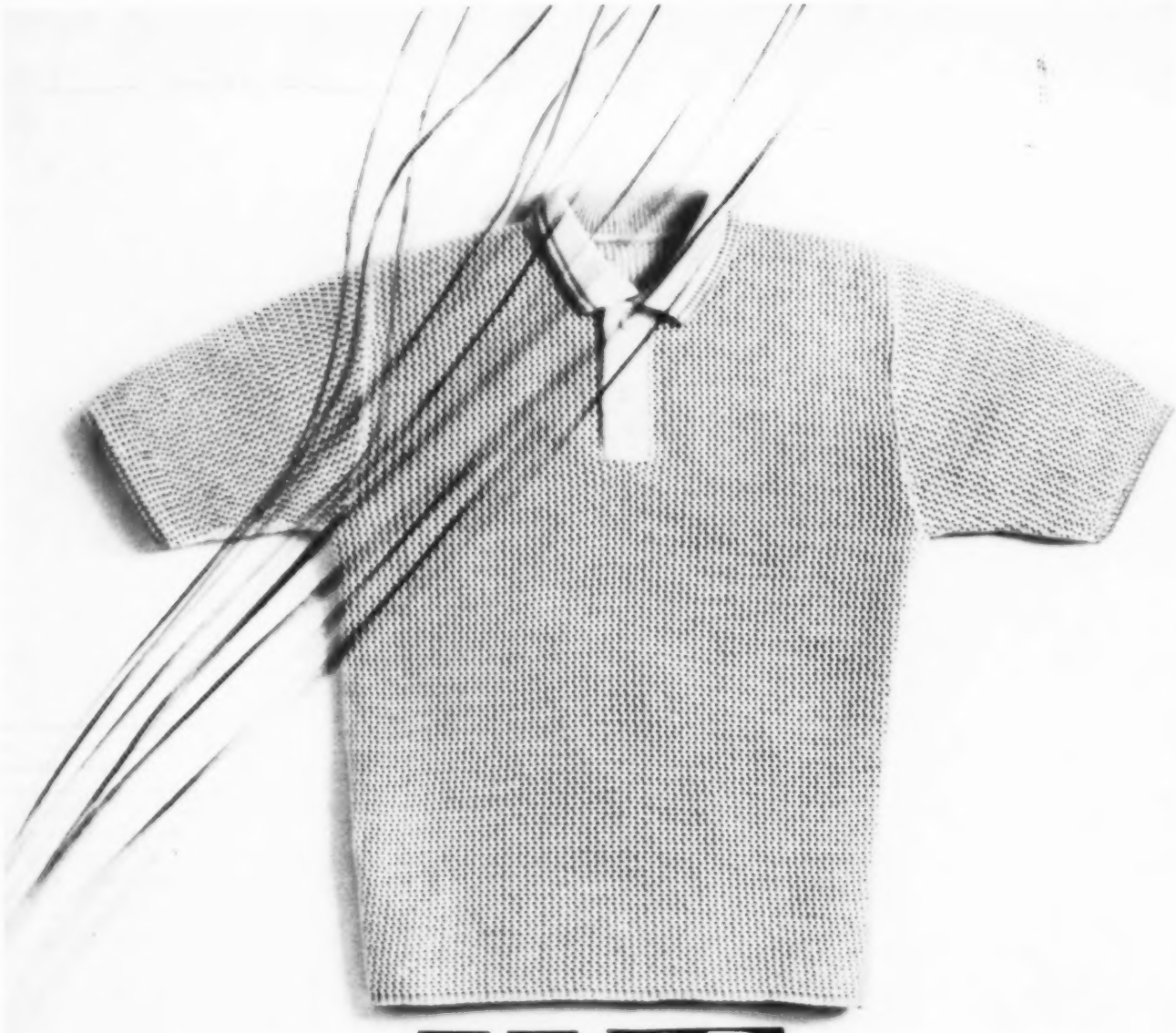
New opportunities for Textralized yarn in knitted outerwear are being constantly made commercially available through the efforts of Joseph Bancroft & Sons Co. and its licensees. To specifically meet the fashion demands of the knitted outerwear market, a combination of skill, enthusiasm, and the versatility of Textralized yarn continues to produce yarns which can be made into garments which offer, along with the established qualities of Ban-Lon garments, an expanding variety of fashionable surface textures, colors, and designs.

## RHOVYL USED IN KNITTED APPAREL

THE role of Rhovyl in knitted outerwear was pointed up in a paper recently presented at the Benjamin Franklin Institute in Philadelphia. Rhovyl is a polyvinyl chloride fiber produced in France. It was explained that Rhovyl is used in knitted outerwear largely in blends with wool to impart to the fabric increased warmth than is attainable solely with the natural fiber and to curb the tendency of wool to felt. The presence of Rhovyl in a blend with wool also promotes dimensional stability of the garment.

In addition to combinations with wool, Rhovyl is also mixed with 70 per cent viscose rayon and knitted on an interlock machine. The resultant fabric, after appropriate finishing, has a doeskin-like effect.

Production of Rhovyl in France has been mounting steadily. Output thus far this year is 45 per cent ahead of production in 1960.



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*Synthetics Fiber Review*

# Synthetic Fibers Developments In Britain And Europe

THE biggest synthetic fiber news announcement in Britain this year was undoubtedly that made only a few weeks ago by Imperial Chemical Industries Ltd. A polypropylene fiber called Ulstron is now being made on pilot plant scale by the company at Wilton in Yorkshire.

I.C.I., already producing one outstandingly successful fiber, Terylene, and British controller of the Scragg bulk relaxation process which produces Crimplene, signed up with the Italian Montecatini organization just over a year ago to acquire exclusive rights to produce polypropylene fiber for textile uses in Britain.

The British trade, with an enthusiasm set alight by reports of polypropylene developments in the U.S. and other parts of the world, has waited anxiously for news of the introduction of a similar fiber in Britain. Now this has been made.

Initially, I.C.I. is producing only a multi-filament yarn for internal evaluation and market appraisal work, but knitters are eager to see what value a staple form could have in their own sector of the industry. There have been conflicting reports from Italy about the use of Meraklon, the Montecatini fiber, in experimental knitted outerwear applications, reports that have praised its warm handle and versatility, its cheapness, yet which have also damned its sunlight degredation properties and awkwardness in dyeing. Nevertheless, say the experts, all the most successful fibers have had teething problems and although polypropylene has certainly got its fair share there is a good chance that it will be ranked along the other big two fibers, polyamides and polyesters, by the end of the next decade.

The I.C.I. polypropylene is described as having a tenacity of about 8.5 grams per denier, putting it in the same strength bracket as Type 600 nylon, and making it the strongest polypropylene fiber being produced in the world today. It is said to be stronger than Terylene (and therefore than Dacron); it loses no strength on wetting—in fact certain tests indicate that in the wet state its strength is actually greater.

Stretch properties are midway between those of Terylene and nylon. It is also the lightest fiber known, with a specific gravity of 0.91. Chemical resistance and resistance to abrasion are outstanding, and the fiber is completely rot-proof and absorbs less moisture than a polyamide or polyester fiber. I.C.I. says that long term sunlight exposure trials are under way to determine fiber performance in applications where sunlight resistance is critical.

Initial quantities of Ulstron will be used in industrial applications, but a plant is already being prepared which will have an annual production of five million pounds. Price at the moment is between seven and eight shillings (about 90 cents to $1.00) per pound. There are already reports from various parts of the Yorkshire worsted trade of polypropylene staple being available for spinning trials, although these reports are not official. It seems that dyeing difficulties can be overcome by dope dyeing methods or by staining processes.

**Success of Courtelle**

The main commercial success of the year has been that of Courtelle in the double jersey field. "Courtelle has the double jersey trade by the short hairs," said a director of one of the biggest knitted outerwear companies recently. Courtelle is the acrylic produced by Courtaulds Ltd., the only British developed acrylic fiber in commercial production.

The company introduced the fiber to the double jersey trade and was rocked by its reception. Demand became embarrassing; in June an annual rate of production of 12 million pounds was nowhere near high enough and plans had to be rushed through to boost the rate quickly. As it was, other acrylic fibers such as Acrilan and Orlon benefited owing to the promotion and shortage of the Courtaulds fiber. Now Courtelle is being produced at an annual rate of 22 million pounds and this will be further increased to a rate of 32 million pounds yearly by 1962.

Courtelle was initially chosen to be promoted in double jersey and knitwear because it gives stability to a knitted garment, makes it warm, and simplifies washing and drying. Dyers can produce clean, light colors on Courtelle garments and the fabrics retain a good handle and excellent tailoring properties.

Courtaulds' own development mill, Westcroft Mill, near Bradford, is currently utilizing a battery of five Turbo Staplers to produce Courtelle tops for the knitting trade. The processing cycle encompasses Turbo stapling, steam setting, passage through a double breaker and intersecting gill boxes. High-bulk yarns are produced by combining stable and high-shrink varieties of Courtelle staple. When this type of blend is relaxed later in the processing cycle (by steaming or during dyeing) the high-shrink component contracts to produce bulking in the yarn. This, say Courtaulds, gives an exceptionally bulky yarn of low density.

In the processing a single tow of about 480,000 denier is used, and efforts are made to feed the filaments into the Turbo unit as parallel as possible. Correct tension is regarded as being of the utmost importance and some top makers use an overhead system of tensioning bars on their units. The Courtelle is thus processed with a tow band of around eight inches at the back rollers for a three filament denier Courtelle. Heat stretching is carried out with a draft of 1.39 between back and intermediate rollers with the hot plate temperature at 240°F, and with the lower back feed roller running at about 55 revolutions per minute. Most efficient drafts in the stretch break zone are 2.73 between intermediate and front rollers and 2.08 between deflecting rollers (or breaker bars) and front rollers.

Steam setting is used to relax the stretch broken material. Tops are usually produced by gilling blends of about 60 per cent of this fiber with 40 per cent unrelaxed sliver. The resultant yarn or fabric is bulked by relaxing the strained percentage by steaming.

Tentative plans have been announced for introducing Courtelle double jersey fabrics to the North American market in view of the growing interest in this type of fabric. As matters now stand, no full details of this scheme have been revealed but it is planned to market the Courtelle in fabric form, not as fiber.

Recently another Courtaulds knitwear yarn was highlighted in a special exhibition held in Leicester. The fiber was Courtolon, a false twist yarn which has been processed by Courtaulds. The nylon for the yarn is bought from British Nylon Spinners Ltd. The false-twist method used is still secret.

Courtolon is marketed as a straightforward false twist yarn and also in various modified stretch forms (Courtolon X10, X20, X30). The modified forms were first introduced some time ago but now, owing to the trade's ready acceptance of some and not of others, it is said the range may be shortened.

Designed primarily for knitwear, a dyed Courtolon yarn with a soft, full handle has been developed and is now available in large dye sets in a range of fashion colors. Although a wet relaxation treatment is generally recommended for this yarn, in certain knitted constructions complete relaxation can be obtained by steam pressing. Courtolon blended with acetate fiber is finding increasing use in swimwear.

Courtaulds also recently revealed an entirely new range of jersey fabrics knitted either wholly of rayon, or of rayon blended with other fibers. The fabrics, called Sophistic fabrics, embrace a great variety of constructions and colors. They are hardwearing and, owing to certain construction and finish details, have drip-dry and easy

(*Continued on Page* 47)

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*Synthetic Fibers Review*

# Muff Dyeing Of High-Bulk Type 42 Orlon Acrylic Fiber

By H. T. PRATT
Textile Service Section, Textile Fibers Department
E. I. Du Pont de Nemours Company, Inc.

OF THE various methods that have been developed for package dyeing high-bulk yarns of Orlon acrylic fiber, dyeing of muffs is becoming the most popular. A muff is a coreless package, named for its resemblance to a hand muff. Historically, muff dyeing had its beginning in the winding of "false cakes" for dyeing rayon filament. Later on, nylon filament was dyed in this way. With the development of nylon stretch yarns, skeins were wound on reels and steam bulked to form muffs. Since a muff with a large diameter core allows for high shrinkage it is ideal for dyeing high-bulk yarns of Orlon. In order to develop maximum bulk, it is of utmost importance that the yarn have adequate space in which to shrink from 20 to 30 per cent. Some mills reportedly have wound high-bulk yarn directly on springs or rigid tubes and dyed without pre-bulking. This method gives low count yarns on the inside of the package, the poor quality; it definitely should not be used.

Muffs can be wound on either spindle-driven precision or face-driven winders. The muff winding unit essentially is a "false cake" winding device such as the type sold by the Leesona Corporation. It consists of a plastic tube, four and one-half inches in diameter and six and three-fourths inches long, fitted over end flanges that replace the regular dye tube holder.

Muffs are wound in the same way as dye packages. A one-pound muff is normal, but the exact size will depend on the dye carrier spindle spacing. Lightweight muffs of eight to 10 ounces are unstable during dyeing. Grooves form at the top of the muff which allows the dye liquor to by-pass the yarn. To build a one-pound package on the precision winder, it may be necessary to increase the distance between spindles, and to increase the length of the traverse frame dog so that the back press will open sufficiently to accommodate the muff. The Leesona Corporation supplies such modifications for its No. 50 Winding Machine; Foster 75 winders need no modification. Replacing the washboard tensions with disc tensions reduces the amount of fly. A knitted cotton stocking drawn over the muff greatly increases stability.

Winding conditions for a 2/20 w. c yarn are:

Winding speed — 500 yards per minute. (Average)
Yarn Tension — 8 grams
Back Press Pressure — 450 grams
Wind — 2½
Muff Weight — 1 pound
Winding Time — 10 minutes.

The same type of muff holder used for precision winders also can be adapted to face driven winder such as the Foster 102. Although the muff is not as stable as a muff wound on precision equipment, the yarn bulk that is obtained is about the same. Winding speeds of 350 to 600 yards per minute can be used, but the lower speeds give the most trouble-free operation.

Close delivery yarn guides cannot be used because they drag against the face of the muff as the size increases. Winding conditions for a 2/20's w. c. yarn are as follows:

Pressure Weight on the Spindle Arm — none.
Pressure on the Friction Spring — Just great enough to prevent roll chatter
Wind — 1
Yarn Tension — 15 grams
Winding Speed — 350 yards per minute
Muff Weight — 1 pound
Winding Time — 15 minutes.

Muffs can be handled several different ways for dyeing. Choice of a method will depend largely on the available equipment, the cost of handling, and the quality that is demanded by the knitter. The greatest amount of bulk is obtained by loading muffs directly into the dyeing machine so that each is individually supported. A one and five-eights inch dye tube is inserted into the muffs, and then each muff is separated with an approximately seven-inch diameter metal plate as they are placed on the dye carrier spindle. This method of loading gives each muff exactly the same amount of space in which to bulk. As the muff shrinks towards the dye tube, it will fill out all of the free space between the separating plates. It is particularly suitable for tall carriers since the weight of 12 to 14 muffs stacked on one another tends to compact the bottom muffs and decrease yarn bulk.

Another method is to preshrink the muffs in a conditioning oven or autoclave onto springs and then dye them as conventional packages.

This method requires more yarn handling, but since the package diameter is smaller, dyeing machine loads are increased by 20 to 30 per cent. Yarns dyed by this method are more tightly compressed and are of lower quality than those dyed by the first method. It is of utmost importance to preshrink at a temperature 10 to 15 degrees lower than the dyeing temperature and to allow sufficient time for all parts of the muff to reach the same temperature. Otherwise there will be dye differences in the yarn caused by differences in heat history.

On short carriers, the muff is sometimes dropped over the dye spindle without separators. With this method, the muff becomes very distorted, yarn quality is poor, and the back winding is extremely difficult.

Folowing is the dyeing procedure:

1. Set the bath at 140 degrees Fahrenheit.
2. Set the pump flow from inside to outside at a differential pressure of five to 10 pounds per square inch. Inside-out flow and low operating pressures througout the dyeing cycle prevent yarn flattening and give maximum loft.
3. Add the chemicals and dyes and bring the bath temperature to 220 degrees F. at the rate of two degrees F. per minute. Dyeing at 220 degrees F. give 50 per cent transfer of dye and thus very uniform dyeings.
4. Run for 30 to 45 minutes depending on the depth of shade.
5. Cool with a running rinse. Do not drop the bath. Dropping the bath while hot allows the yarn to compress under its own weight.
6. Scour if necessary and give a running rinse. Do not drop the bath.
7. Apply one to two per cent of Cationic Softener for 20 minutes at 120 degrees F.

Muffs after dyeing look like and can be handled like regular package dyed yarns. Yarns can be dried on port dryers or by centrifugal extraction and tray drying. It is not advisable to backwind the yarns damp since the finish can deteriorate and develop an odor during storage.

The choice of a backwinding method will depend on many things. Since the yarn shrinks on itself, there is some crinkling of the yarn on the inside of the muff near the center. These crinkles have a tendency to cause snagging and the yarn breaks during backwinding. The amount of crinkling will depend on yarn shrinkage, yarn construction, winding conditions, and other variables. Therefore, the dyer should try several of the following backwinding methods to determine which is the best suited for a particular yarn:

1. Take off over-end, using a four- to six-inch tube cap.
2. Backwind from the inside of the package to the outside.
3. Insert an expandable metal form and takeoff over-end.
4. Takeoff over-end from an expandable rayon cake reel using a six-inch tube cap.
5. A rolling takeoff from an expandable rayon cake reel.
6. A rolling takeoff from a spindle fitted with a dye tube holder.

Method 1 is the only one suitable for backwinding yarns that are preshrunk on springs since the springs are firmly held by the yarn and not easily removed. Backwinding from the inside is the simplest method since there is no snagging of the yarn. As the dyed muff is rela-

(*Continued on Page* 45)

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***IFKS Annual Conference Paper***

# New Developments In Synthetic Fiber Knit Finishing

By DR. W. BRENNECKE

IN THE knitting trade, as in every other industry, the methods of production and the range of products obtainable have in our time rapidly expanded and have steadily become more and more diversified. The manifold possibilities presented by new techniques in production methods have resulted in the creation of an extensive range of products of varying appearance and a wide choice of fabrics for a variety of purposes, the nature of all these fabrics differing according to the demands made upon them in use. Two factors in particular have contributed to this, viz:

1. The increased scope of the raw material itself, made possible as a result of the evolution of synthetic fibers of varying types and forms.

2. The present versatility of the dyeing and finishing operations. It follows, therefore, that the knitting industry will most successfully adapt itself to these varied trends in development if it will closely investigate, and make full and skillful use of the two co-related factors mentioned.

**Hosiery** — The knitting, dyeing and finishing of hosiery certainly cannot be regarded as one of the most recent fields of activity, but even here certain progress has been made in these latter years, this progress, in the main, consisting of a rationalization in the manner of treatment. Nowadays stockings are almost invariably washed and dyed in a single bath only. Washing is generally effected by the use of non-ionic washing agents with the addition of oxalic acid to ensure the removal of machine stains and metal chafe marks. Neutralization then follows, the liquor being rendered slightly alkaline. Thence direct into the dye liquor, at the same heat, for dyeing.

The more up-to-date process, which is a far more rational procedure, particularly where large production lots are involved, is the system of dyeing in special automatic high temperature machines, such as the Colorplast Machine, as developed in Germany. In machines of this type the dyeing solution is supplied into the machinery only after first having been made up to a pre-determined recipe.

The stockings are drawn on the shapes (boarded) from which they are removed after passing through the machine. Apart from this everything else is done automatically by the machine. The stockings travel forward in a pressure-tight enclosed chamber where they are sprayed with the dye liquor at 120° C.—in the case of Perlon stockings (R=VORFAG registered trade mark)—being washed and dyed by the liquor for about two minutes. At the same time, under these high temperature conditions the mesh straightens itself out and the stockings are stabilized, while the levelness of the dyeing is so good that even metallic complex dyestuffs can be used. From here the stockings pass forward into a second chamber where they are softened or finished and then dried.

**Shirtings** — Knitted shirtings made from Perlow nylon and other polyamide fibers are highly esteemed and are in great demand. For this reason the warp knitting mills here in Germany and in many other countries also have extensively taken up the manufacture of shirtings so as to meet the widespread demand for this class of fabric, which can also be used for blouses, frocks and similar articles.

The treatment these shirting materials are called upon to withstand is quite different from that of, say, knit underwear. Appropriately different structures and correspondingly different methods of finishing are therefore called for. Here the process of hot air stabilization, in common use in the case of other types of fabric, has less to recommend it inasmuch as this method does tend to make the material harder and, what is of primary importance, stabilization by saturated steam at 125° C. and stabilization under pressure in water at 120° C. give a better stability of shape, such as is required for these shirting materials.

When, however, in the absence of any other means, it is required to stabilize this class of material by hot air, the fabric, in roll form and entirely free from creases, must first be steamed, tensionless, and then pre-stretched on the stenter at 140 to 150° C. It is then washed in a jig, with very little tension, at a temperature of up to 60° C. and is then stabilized in the ordinary way. Dyed goods must, of course, be dyed with selected, stabilization-resistant dyestuffs.

Admittedly stabilization by saturated steam cannot be effected as a continuous process, but it does yield a better fabric. In this case the fabric is first washed and dried tensionless, is then rolled up, free from any creases, and is stabilized in an autoclave in two operations of 15 minutes each, starting off by vacuuming and with another vacuuming between the two operations.

Treatment of warp knitted shirt fabrics in high temperature machines is particularly to be recommended. Here the fabric, as supplied from the warp knitting machine, is steamed as it enters a stenter, is then run through the stenter at a temperature of about 140-150° C., where it is rolled slack, but not too slack, i.e. with a slight excess of delivery over take-up, on to a beam. The stretching of the polyamide, when dampened, automatically results in a slackening of the rolling-up.

Where it is desired to dye the fabric or to give it an optical luminant finish, it is first washed for 10 minutes at 40° C. then in the same bath, treated with optical luminant, or dyed and, at the same time, stabilized. Naturally when high temperature dyeing is adopted high temperature resistant dyeing agents must be used. Where stabilization on the beam is practiced either by saturated steam or in the high temperature machine, it is of the utmost importance that the fabric should be perfectly rolled on the beam, entirely free from any creases whatever, as any such creases or folds in the fabric are thus so firmly stabilized that it is impossible ever to get rid of them.

**Text of talk delivered by Dr. Brennecke at the 6th Annual Conference of the International Federation of Knitting Specialists held in Manchester, England, October 8-13.**

Perlow with an in-spun optical luminant can be washed and stabilized on the beam in the high temperature machine in one operation. It is of advantage to wash with a fatty acid condensation product in a slightly acid bath with acetic or formic acid heated to 120° C., treat at this temperature for 10 minutes, then cool off to 80° C., set to pH 8, rinse, dehydrate and dry at 130° C., thus permitting of shrinkage in length and width.

The use of polyamide yarns with in-spun optical luminant presents the advantage that, in this case, the insoluble luminant is wash resistant and thus the gleaming white effect is not affected by repeated washings.

Well-finished knitted shirtings should not show a shrinkage of more than one per cent when boiled. While men's white shirtings are, at the present time, most predominantly in favor, there is also a certain demand for dyed shirtings for casual wear.

If better fastness or color is required, which cannot be obtained by the use of dispersed dyes giving good level dyeing, the tendency of the polyamide knitted material to show streaks may well be the cause of the trouble. This tendency can be a very considerable nuisance where dyestuffs are used which do not readily produce an even shade with good fastness to water. It is, of course, possible to obtain level dyeing with a high degree of fastness by the use of naphthalene dyestuffs and also with reactive dyeing agents, but in such cases the tints of color and the shades it is possible to obtain are very limited. In actual practice still further difficulties are encountered.

Very stable colorings can likewise be obtained by the use of selected vat dyes, always provided that the high costs entailed are not prejudicial to production.

(*Continued on Page* 29)

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A further possibility is dyeing by means of selected acid dye stuffs, at the same time using some special levelling agent, as obtained from various color and dye works. To improve still further the fastness to water of such dyeings subsequent treatment with tannin tartar emetic can be adopted.

As dyeing on polyamides will not, in general, withstand stabilization by saturated steam or by water at high temperatures, streak effects are possible only where fast color threads are worked along with spun dyed yarns.

**Velour and Raised Fabric**—In producing warp knit velour, the primary fabric is washed in a winch vat. Then, after drying and stabilizing, dyed or bleached and softened. Softeners with opening properties must be used if a good quality velour is desired. The ordinary raising machines are used for the operations of velouring and raising the knitted fabric. The number of passes varies according to the effect desired. In this process the material contracts by a third or a half, and this must be borne in mind in the set-up of the primary material. After raising, the material is then stretched—this is best done at high temperatures of about 140° C. Only in the case of raised goods is a final shearing or cropping required, inasmuch as, in the case of velours, the threads are only raised up, as opened to raised goods where the threads are raised and broken (cut).

Prints from disperse dyes are dried for half an hour without any pressure on them, and then rinsed. Prints from acid or metal complex dyes are soaped at about 50° C. after steaming.

Vat dyes call for careful selection, as a number of vat dyes have a bad effect on the fastness to light of polyamides. An English patent, however, enables the fastness to light to be improved by a subsequent treatment with salycilic acid, primarily in the case of yellow, orange, red and brown dyes. After printing, the fabric is steamed in the Mather & Platt steamer or some high speed steaming machine and oxidized with natrium nitrite and sulphuric acid or natrium chloride and nitric acid, and soaped with the addition of natrium perborate.

**Backing and Sheeting**—Adhesives with increased stability have been evolved for flock printing and these are widely used for the particularly active field of foam backing. The backing of woven materials with foam sheets has long been known and adopted: the backing of knitted fabric no less than woven fabric is now successfully practiced. Foam-backed material is used, for example, for upholstery and for automobile equipment. Recently, however, outer garments with a foam backing have been produced which are both soft and remarkably light, so that really warm winter coats are only quite light in weight. Such articles must be able to withstand cleaning with chemicals, and so an adhesive is called for which is likewise resistant to chemical action.

In hot lamination under the Curtis Wright Ltd. patent, the rubber foam is melted and fused to the knitted fabric. To ensure good fusion ¾ to 1 mm. of the foam itself must be melted, which makes this process more expensive than working with an adhesive.

In cold lamination, to a process evolved by the Alana Textil GmbH, Düsseldorf, the foam is dissolved and then bonded to the knitted fabric in the same way as in the hot lamination process.

This cold lamination process and particularly the hot lamination process on the Curtis Wright principle is a paying proposition only when very long lengths are involved. For small and medium lengths the process of backing with an adhesive is far more economic.

Only a few of the adhesives available at the moment are resistant to chemical action.

**Glitter effects**—Special effects can be obtained by the use of polyamide threads of irregular section, as marketed in America as sparkling nylon and in Germany as Perlon glitzernd (glittering, or sparkling Perlon). Threads of this type reflect the light from their surfaces. Even though the use of such threads to give a sparkling metal effect is precluded in the case of heavy goods such as brocades, where metallic threads are called for, very similar effects can, in fact, be obtained from such polyamide threads, and most attractive effects are obtainable in materials of soft and flowing texture when such special yarns are used. Full advantage is taken of this in the manufacture of woven materials, but the same principle is particularly applicable in the production of knitted fabrics where a soft, supple yarn is used in the formation of the mesh.

**Knitted fabrics from texturized yarns**—A very fruitful future field for the knitting and hosiery industry is the working of tufted yarns. Texturized yarns from endless threads, such as Helanca, Ban-Lon and others, are already being extensively used, for instance, for swim suits. Further development in the manufacture and treatment of such structure yarns has recently contributed in great measure to the manufacture of various types of outer garments, too, from this class of yarn. This development has been greatly expedited by the introduction of low stretch structure yarns, as for pullovers, cardigans, etc. such a large degree of structural elasticity is not required as in the

Circular knitted fabric is stabilized either in special machines, as, for example, made in Germany by the firm of Trockentechnik, Stuttgart, or is thoroughly boiled. Flat knitted goods made from structure yarns for outer garments must always be stabilized. To develop the tuft effect they are first inserted in a bath and are treated for 20 minutes at a temperature of 30° C. in a liquid containing 1 gram per litre of a non-ionic washing agent and 1 g./1. of trinatrium phosphate. Then they are washed for ½ minute at 45° C. in the same bath and are given a thorough rinse, during which process it is important to gradually cool down the warm liquid and not to cool it down suddenly and abruptly. After hydro-extraction it is dried, in suspension, at 80° C. and is then stabilized with saturated steam. In this process the autoclave is first set to the vacuum and then the material is stabilized for 10 minutes, in the case of nylon 6 at 115° C., in the case of nylon 66 at 130° C. The machine is again set to the vacuum, after which the material is again stabilized for a further 10 minutes.

Dyeing is effected in a winch dyeing machine, with the level of the liquor as high as possible, the short distance between the winch and the liquor preventing the hot material from stretching unduly under its own weight. After de-hydrating it is dried in suspension at 80° C. The material is finished on a calender running tensionlessly, with overrun, during which process the stretch motion is set to 10 to 12 per cent wider than the finished width required.

Structurized yarns can be made not only with polyamides but also with polyester yarns. For these the same treatment is applicable as for nylon 66.

**Polyester fibers in the Knitting trade**—Mixed yarns also are used in the knitting trade for the manufacture of underwear, these mixed yarns being composed of ⅔ polyester fibers and ⅓ cotton. To give added brightness, special fluorescent whites, such as, for example, Uvitex ERN, must be used, as the fluorescents in normal use for cotton and polyamides have no effect on polyesters. Special points have to be taken into consideration in the dyeing process too, as, when dyeing polyester fibers with disperse dyes, carriers have to be used if high temperature dyeing is not possible.

In the first instance polyacrylic fibers were used as the only synthetic fibers which would give lofty knitting yarns, while polyamide and polyester fibers also mixed with wool or cotton were used for hard-twisted yarns in close settings, as otherwise there was a great risk of matting. Recently, however, special types of polyester fibers have been evolved, by the use of which the risk of matting is greatly reduced and which are suitable for the manufacture of jersey fabrics.

**Lace curtaining**—The use of synthetic yarns for the manufacture of lace curtain material has spread very extensively, polyester yarns being used predominantly for this purpose. Quite apart from the marquisette woven lace, knitted and bobbin lace curtain materials are in wide use. Whereas, formerly, the most favored practice was to dye polyester curtainings with pigment dyes, a large percentage

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*Knitting Principles*

# Fundamentals Of Warp Knit Engineering—Part 14

By A. REISFELD
Director, Research and Development
Gehring Textiles, Inc.

SYNTHETIC and cellulosic staple fibers are not as yet a big factor in warp knitting. They play an insignificant part in tricot and only in medium and coarse gauge Raschel trade do they find some measure of acceptance. However, with gradual improvements in man-made fiber technology, their lower prices and the introduction of new materials of merit, their use in warp knitting is bound to increase.

There are two ways of utilizing man-made staple fibers: (1) In pure form, where the yarn is spun out of one synthetic or cellulosic material only, and (2) in blended form, where one or more different types of fibers are combined in the yarn.

We shall commence our study with consideration of man-made yarns in pure form. There are two basic types of man-made fibers: (1) Cellulosics, derived from cellulose and either regenerated (viscose) or modified (acetate), and (2) synthetics obtained through synthesis of several chemicals other than cellulose or its derivatives.

Because of the confusion generated among manufacturers and consumers due to proliferation of man-made fibers, the FTC (Federal Trade Commission) introduced in March 1960 the "Textile Fiber Product Identification Act." The Rules and Regulations of this Act aimed, among other things, to bring some order into the rapidly expanding host of fiber trade names by creating generic terms for every group of fibers. Thus, such trade names like Dacron, Vycron, Kodel, Fortrel, etc., come under the generic term: polyester. A partial list of fiber trade names and their FTC generic terms is shown in Table I. Only staple fibers which are, have been or could possibly be used in warp knitting are enumerated. Additional information on some of the fibers and their application in knitting may be found in the reference literature cited.

It will be seen from Table I that the inventory of cellulosic fibers, i.e., rayon and acetate, is quite small in comparison to synthetics, the number of which is growing at a quickening pace.

The natural staple fibers like wool or cotton are clipped off animals or picked off a plant. Both occur in staple form only. Synthetic staples, on the other hand, must be first extruded as continuous filament and then reduced to staple form by chopping up the filament bundle. The resultant material is subsequently spun into yarn.

It may seem strange to produce a perfectly usable filament yarn only to break it up into staple and after several processing stages reassemble it into yarn again.

There is, however, good reason for converting filament into staple and spinning it back into yarn form. Filament and spun yarns, whether derived from the same material or not, possess different physical characteristics. Thus, filament and spun rayon are so dissimilar in their properties that fabrics produced by them will differ from each other in almost every respect.

The main feature of spun yarn is its high bulk to weight ratio. Because of the fiber disposition in the spun yarn cross-section, it will have much better bulk than filament yarn of equivalent count. This bulk will also result in greater covering power, superior absorption, opacity, warmth and other important characteristics.

The differences between filament and spun yarn properties will be propagated into fabrics knit thereof. Thus, if we took, say, 100 denier filament rayon and the equivalent 54/1's c.c. spun rayon, and knit each into the same quality jersey, we would find that the spun fabric was superior in such respects as bulk, softness of hand, heat insulation, cover and opacity, and moisture absorption and permeability.

On the other hand, the filament fabric would be superior in regularity in appearance, smoothness of texture, dimensional stability, fullness of drape, strength, and resistance to pilling.

## TABLE I

| GENERIC TERM | TRADE NAMES |
|---|---|
| Acrylic | Acrilan (137), Creslan (138), Zefran (140), Orlon (139) |
| Acetate and triacetate | Chromspun, Estron, Arnel, Arnel 60 (141), Alon (142) |
| Glass | Fiberglass (143) |
| Modacrylic | Dynel (144), Verel (145) |
| Nylon (146) | Nylon 66, Nylon 22, Nylon 6. Mostly named after their producers |
| Nytril | Darvan (147) |
| Olefin (148) | Olane, Reevon 80, Prolene (149) |
| Polyester (150) | Dacron, Terylene (151), Fortrel, Kodel (152), Vycron (153) |
| Rayon (154) | A number of rayon staples of modified physical properties are now available on the market. The best known are:<br>Avril—high wet modulus (155)<br>Avron XL—high tenacity (156)<br>Coloray—solution dyed (157)<br>Corval—cross linked<br>Topel—cross linked<br>Fibro—regular staple<br>Zantrel Polynosic—high wet modulus (158) |
| Vinal (159) | Vinal MS, Vinal FO, Vinylon, Kuralon |
| Vinyon | Vinyon HH (160), Rhovyl (161) |
| Metallic | Lame, Laminette and staples made by Dobeckmun, Metlon and Reynolds Co. (162) |

In comparing the two materials, it should be borne in mind that filament yarns are cheaper to warp and knit on account of their strength, elasticity, uniformity and relative absence of knots. There is no lint shedding as in the case of staple yarns. The warping and knitting equipment may be run at higher speeds with lower incidence of imperfections.

Despite the obvious advantages and faults of staple and filament fabrics, one is preferred over the other for certain end-uses which capitalize on its meritorious points. Thus, for a polo shirt we would use a staple fabric since it is essential for this type of garment to have maximum absorbing powers, good cover and opacity. Fullness of drape, smoothness of texture and strength are of secondary importance here.

For children's sleepwear we would again use staple fabric because of its bulk, soft hand and heat retentive characteristics. Such applications as lingerie, pajamas and certain types of dresses would generally call for filament cloths on account of their sheer, regular texture, good drape and dimensional stability.

The above examples do not really reflect any hard and fast rules. Fashion, price, novelty and other considerations may overrule physical factors governing the choice of yarns for a given end-use.

In many instances attempts are made to impart to a filament fabric a spun appearance by a napping or sueding treatment and, conversely, lend the spun construction a filament-like texture by using hard twisted mercerized yarns in conjunction with a suitable finish.

Frequently the advantages of filament and spun materials are combined by using one on the back bar and the other on the front. If filament yarn is used on the back and spun on the front, the resultant fabric will have the basic characteristics of a spun construction plus the advantages of filament, such as improved strength, drape and stability.

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By judicious selection and combination of filament and spun yarns, their threading in guide bars and stitch construction, fabrics can be produced which possess characteristics of both materials to any desired degree. Application of thermoplastic yarns and heat setting of the fabric can substantially improve its dimensional stability.

In drawing a comparison between spun and filament materials, it is necessary to mention the newly introduced bulk yarns. Bulking improves their covering and absorptive powers to a point where fabrics knit with bulk yarns are in many cases superior in cover, hand and absorbency to those made of equivalent count staple yarn. This enables bulk yarns to penetrate certain fields hitherto deemed an exclusive domain of spun materials.

One should carefully distinguish the continuous filament bulk yarns such as Ban-Lon or Taslan from high-bulk staple yarns, which we shall discuss later on. The rapid advances in bulking technology do not spell an early replacement of spun yarns with bulked filament. The cost of manufacture and processing of bulk yarns is high in comparison to that of staple.

Although fabrics knit with bulk yarn are lighter than their staple counterpart of equivalent cover and bulk, this, however, is not enough to offset the price advantage enjoyed by staple yarns.

It is interesting to compare the relative economics of equivalent count cotton and rayon yarns (prices of July 31, 1961, quoted in cents), as shown in Table II:

Rayon deniers are the nearest commercially available equivalents to cotton counts. Analysis of the data in Table II reveals that filament rayon enjoys a growing economic advantage as the denier becomes finer. However, above 125 denier cotton becomes cheaper for singles carded and combed yarns. Combined plied and mercerized plied yarns are always more expensive.

The limited quantities of cotton yarns used in tricot are combed singles and plied. Staple rayon has been used to a small extent in this country, but European tricot knitters employ it

**TABLE II**

| Carded | | Combed | | Mercerized | | Rayon | |
|---|---|---|---|---|---|---|---|
| Count | Price | Singles | Plied | Count | Price | Denier | Price |
| 8 | 59 | — | — | 14/2 | 109 | 600 | 69 |
| 12 | 61 | — | — | 24/2 | 114 | 450 | 69 |
| 18 | 63 | 73 | 81 | 36/2 | 124 | 300 | 73 |
| 20 | 64 | 74 | 83 | 40/2 | 128 | 250 | 74 |
| 26 | 69 | 77 | 87 | 50/2 | 140 | 200 | 81 |
| 34 | 74 | 84 | 95 | 70/2 | 185 | 150 | 75 |
| 40 | 83 | 89 | 102 | 80/2 | 216 | 125 | 90 |
| 50 | — | 104 | 111 | 100/2 | 307 | 100 | 96 |
| 70 | — | 135 | 145 | —— | — | 75 | 110 |

quite frequently. Mercerized yarns are as a rule used plied, although singles are available on special request. They have been utilized in tricot knitting only for high-class specialty articles because of the prohibitive cost.

The Simplex trade uses very fine count cotton yarns spun from Egyptian or Sea Island staple. Plied yarns are not possible here, since they would have to be around 200/2, which is extremely expensive if at all available. Staple yarns have found little if any application in Simplex with the exception of staple rayon, which was used by German knitters during the last war.

Carded yarns are rarely used due to non-availability of fine counts, excessive fly and inferior mechanical properties.

Staple rayon yarns are priced at par with cotton, lower or higher, depending on the type of staple used. Normally, however, they are cheaper. The current price of regular viscose staple (1.5-15 denier) is 28 cents a pound, while that of high wet modulus staple costs 43 cents a pound. This should be considered in the light of 33 cents a pound for average cotton staple (July 1961). Its real price, however, after including 10-15 per cent waste is 37-38 cents per pound. For spinning of medium count warp knitting yarns, the cost of cotton staple is around 40-43 cents a pound; i.e., higher than for rayon staple. The relative economics of staple rayon or cotton and filament rayon yarns are meaningless unless viewed from the standpoint of their conversion into fabrics.

Cotton and staple rayon yarns, especially in fine counts, are not conducive to high warping efficiency because of inconsistent strength (caused by thick and thin places) and incidence of knots. The same applies to conversion into fabric where heavy shedding of lint precipitates many knitting and maintenance problems.

Combed ply yarns knit reasonably well, and mercerized yarns run almost as well as filament materials. On the whole, however, staple yarns render an inferior quality fabric with far more imperfections than continuous filament yarns for equivalent construction fabric.

In Raschel, where counts are much heavier, cotton and staple rayon yarns perform quite well, especially since the coarseness of the knitting elements makes them less susceptible to the action of lint. Staple rayon yarns display lesser tendency to shed lint due to the absence of very short fibers and waste normally found in cotton.

On the other hand, filament yarns available on a knotless package weighing several pounds warps and knits with very high efficiency. There is no deposition of harmful lint and loss in weight stemming from it. In many cases filament yarns may be purchased already warped on beams at the same price as on cones. This eliminates the cost of warping and carrying of a large and costly spool inventory.

All these factors combined make filament rayon more attractive and economical than cotton or staple rayon.

While cotton and wool are the principal raw materials for spinning of staple yarns, most of cellulosic and synthetic fibers are also available in staple form. Although cotton staple is with one or two exceptions the cheapest raw material, man-made staples are being used on increasing scale despite their higher price. There are several reasons accounting for it:

1. The man-made staple may be extruded to any specific filament denier and cross sectional shape. It may be cut to any desired length, delustered or rendered semi-dull, crimped or dope dyed.

2. Man-made staple is consistent in all physical properties from shipment to shipment. Cotton, being a natural fiber, shows considerable variations within the same shipment or even within the same bale.

3. Cotton fiber prices are subject to wide fluctuations which are propagated into unstable yarn prices varying from week to week.

4. Waste in cotton, like dust, trash, immature fibers, etc., average 10-12 per cent. There is no such waste with man-made fibers.

To illustrate the first point, let us compare cotton and rayon staple from the spinner's point of view. As far as cotton is concerned, he has a choice of staple length from 13/16 to 2½ inches.

For rayon, there is a currently available range of 1⅛-6 inches and longer staple in filament deniers from 1 to 20 inches. Should any particular staple length or filament denier offer a definite advantage for a certain end-use, the fiber producers will put it on the market, providing the potential volume warrants it.

In addition to the choice of length and denier, there are also staples with various physical characteristics built into the fiber to meet given end-use requirements. Thus, we have staple endowed with high tenacity, high wet modulus; bright, semi-dull and dull luster; high crimp, regular or no crimp; white shade, regular white and bleached; round cross section and irregular, and so on.

We have also a rich palette of solution-dyed staple. One fiber producer offers 30 stock shades in a choice of staple length, filament denier and luster. Nothing comparable exists with cotton.

Having such an array of fibers at his disposal, the technologist can specify fibers or yarns carrying optimum characteristics for the given application and falling within the allotted price range. Thus, if the yarn is to go into soft, frequently washed underwear fabrics, he would specify fine filament (1.0-1.5 denier) short length staple.

(*Continued on Page* 35)

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For an evening dress where crispness of hand and smooth surface is desired, he would use medium denier (3) and medium length staple (2-3 inches). For a drip dry garment where low regain and high wet modulus are essential, he would use one of the new staples expressly introduced for this purpose. To quote an extreme example, for carpeting, he would use a special coarse denier, smooth, soil resistant and long stapled material.

Finally, for color applications involving prolonged outdoor exposure, the solution dyed staple would be the obvious choice. Yarns spun thereof are exceptionally fast to fading and more economical than dyed cotton. Staple rayon may be converted into yarns on cotton, worsted, woolen and jute spinning systems. Only the cotton system is of interest to warp knitters. Yarns up to 120/1's c.c. may be spun from 1-1.5 denier up to 2½-inch-long staple.

Fineness of filament denier is the most important of staple parameters. The lower the denier, the more uniform, smooth and consistent the yarn. Fabrics knit with low denier staple yarn are warmer, bulkier, softer and drape better than those made with coarse filament staple.

On the other hand, low denier also implies low filament strength and hence poor abrasion resistance. This is the reason why we would use high filament denier material for carpeting.

Staple length is also an important factor. The longer the staple, the better the yarn luster, strength and pattern definition. By extending the staple length we can increase the filament denier without producing unduly stiff fabric.

The set of conditions applicable to cotton and rayon do not necessarily hold true for other fibers. Acetate staple, for example, costs 36-40 cents a pound, which is substantially above staple rayon. Yet, in filament form, denier for denier, acetate is cheaper than rayon. Thus, 75 denier acetate runs 86 cents a pound versus $1.10 a pound for rayon.

For synthetics like nylon, the situation is different again. Nylon staple runs about $1.24 a pound in fine deniers. This is disproportionately expensive as compared to filament nylon considering that 40 denier costs $2.01 a pound, 200 denier costs $1.49 a pound and 840 denier costs 92 cents a pound. This means, under no circumstances will it be possible to spin nylon staple for less than the price of continuous filament yarn, since the cost of even medium denier yarns is lower than the raw staple itself.

Staple nylon warp knit fabrics have been made in small quantities for rubber and plastic coated articles. The staple has a much better adhesion and makes a firmer bond with the coating material. When selecting yarn for a given end-use, where it is possible for us to choose between staple and filament yarns, the above-mentioned points of economics must be given careful consideration. In majority of cases, however, we have no option but to employ yarns fitting the end-use requirements of the fabric, regardless of relative economics or knitting performance of staple and filament materials. Thus, for imitation suede Simplex cloth we must use very fine and expensive cotton yarn, although equivalent denier filament rayon would be less expensive and cheaper to knit.

On the other hand, when confronted with the choice of filler yarn for carpeting or pile cloth, we may specify the cheapest material available with little regard to other factors.

**Manufacture of Man-Made Staple Yarns**—Staple fiber may be spun into yarn in either of two ways: (1) By using conventional cotton or worsted system and starting with staple in bale form, or (2) by converting tow into sliver or top and processing it on regular cotton or worsted system or spinning it directly into yarn on tow-to-yarn system.

Since conventional cotton and other spinning systems have been discussed in the previous articles, we shall describe here only the tow conversion and its spinning systems.

A number of methods are available for conversion of filament materials into staple form and subsequently into yarn. All of them commence processing with a large rope-like bundle of continuous filaments. This bundle, termed tow, is extruded from multiple spinnerets. The total tow denier varies from 10,000 or less up to 500,000 denier depending on material and subsequent processing. The individual filament denier is from 1.5 to 20. The tow following extrusion is packed in containers or wound on spools. Several spools are placed in the creel of the stapling machine, and the separate tow bundles combined into one. In some cases, the aggregate denier of tow entering the stapling level may reach 2,000,000.

There are three principal systems used for converting tow into staple form:

- Cutting systems
- Stretch breaking systems
- Abrasion systems

Only a brief description of each system will be renedered here, since the stapling equipment and techniques received a good deal of attention in the textile literature where the reader may find detailed information on the subject (163).

CUTTING — Cutting systems utilize a rotating helical knife to chop the uniformly spread tow into constant length staple. The helical disposition of knife blades causes the tow to be cut and stapled at an angle. The cutting action does not disturb or rearrange the stapled tow. This, however, is a disadvantage as the individual sections of the stapled tow cannot form a coherent sliver strong enough for further processing. Therefore, means are provided to redistribute and disperse the cut sections of filaments to transform them into a self-supporting sliver. This is accomplished either by drafting and shuffling rollers or with the aid of a gill-box. The mass of dispersed sections is held together by the forces of friction developed at the point of contact between them.

Once the sections or staples are dispersed and converted into a sliver, they are crimped and compacted in a so-called crimping box and finally coiled in a can, ready for spinning. The crimp improves spinning performance of the staple and the loft of the knit fabric.

The advantage of cutting the tow is that it does not affect the physical properties of the material, such as shrinkage, tenacity and elongation. On the other hand, the system does not lend itself to preparation of fine denier staple less than three inches in length. Sliver produced by cutting is restricted in use to the worsted industry. The best known stapling equipment is the Pacific Converter, and the Roberts Tematex tow transformer. There is also the Rieter D6/3 converter and the Courtaulds converter.

STRETCH BREAKING SYSTEMS — Here the tow is stretched, pulled asunder and broken by rollers or rotary bars. The action of rollers and auxiliary elements not only breaks up the tow filaments but also lays them parallel to each other and overlapping to form a coherent sliver. There is no need to redistribute the fibers as in the cutting systems since the breakage occurs at random and results in non-uniform length staple.

Stretch breaking alters to a considerable extent some physical properties of the staple. It increases the shrinkage potential but lowers the extensibility. The stretch also modifies the shape of fiber cross-section and, with it, the rigidity and denier.

The stretch breaking systems are capable of producing fine denier short staples which may be spun into strong regular yarns in counts as high as 80/1's or even 120/1's c.c.

The best known stretch breaking machines are the Turbo Stapler and the Seydel machine.

ABRASION CUTTING SYSTEMS —This is the method that is least efficient and most limited in scope. The tow is cut by the action of abrasives into variable length staple. The amount of short length fibers is objectionably high and results in yarn of inferior strength. Abrasion cutting approach to stapling is still under development despite its apparent disadvantages.

**Direct Spinning Systems**—So far we discussed only the systems available for converting tow into sliver or top form. Now we shall consider methods of spinning the tow directly into yarn, generally known as tow-to-yarn. The main difference between the tow-to-top and tow-to-yarn systems is that in the former the resultant top must be used on conventional spinning equipment set up to be converted into yarn, whereas in the latter the tow is spun directly into yarn on the same equipment which does both spinning

(*Continued on Page* 39)

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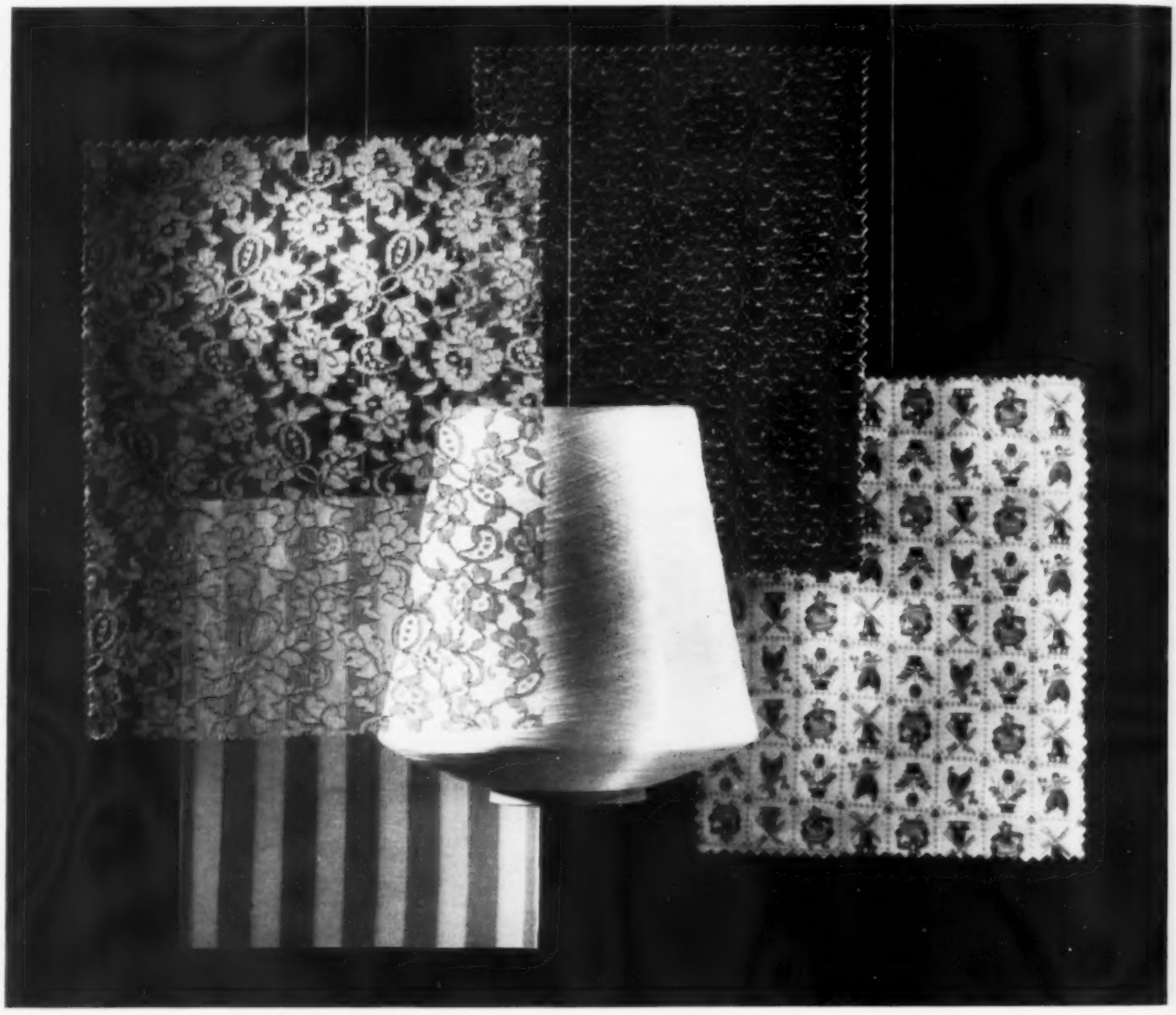

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and stapling. The input is tow and the output appropriate count yarn.

Conversion of tow into yarn is accomplished by first stretch breaking the filaments into staple, then drafting it down to the requisite count and finally spinning it on ring spindles. While this system appears very simple, it suffers from a number of disadvantages which severely limit its application and economics:

1. It requires high quality, fine filament tow with low aggregate denier (under 10,000).
2. Such tow (in rayon) is currently priced at more than double of regular staple.
3. No blending with different fibers is possible.
4. Because of stretch imparted to the fibers on breakage, the yarn has about twice the shrinkage potential of one spun on conventional cotton system.

On the other hand, the direct spun yarns are strong, uniform, free from neps and have only small elongation at break. They may be spun to very high counts (up to 150/1's c.c.). This should make them a good material for tricot knitting if the cost could be brought down to a more economic level.

Direct spinning equipment has been built by Saco Lowell Shops (U.S.A.), Stains of France and Toho of Japan.

**Twistless Yarns** (164) — Before concluding this article, mention should be made of the Tek-Ja process for spinning of twistless yarns introduced several years ago. The main difference between the conventionally spun and Tek-Ja yarns is that the latter system converts roving into yarn by a rubbing action while adding a bonding agent like polyvinyl alcohol to impart yarn cohesion and strength. No twist is inserted at all.

After the yarn is woven or knitted into a fabric, it is scoured and finished in usual manner. The bonding agent is scoured out, allowing the yarn to bloom and fill out the stitches as to produce excellent cover, softness and loft. Yarn cohesion in the fabric is provided by frictional forces generated within the loop structure.

Both synthetic and natural fibers may be converted into yarn up to 100/1 c.c. or even finer.

Absence of twist should make Tek-Ja yarns particularly suitable for warp knitting on account of their freedom from snarling and tangling in case of broken ends. Tek-Ja yarns are still in testing and development stage.

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# NEW PATENTS

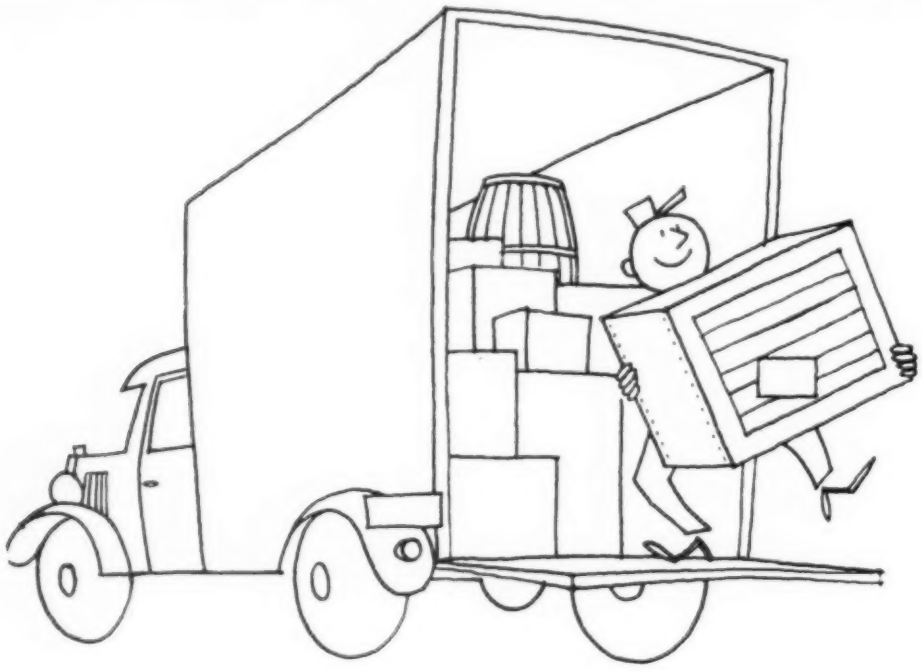
NEW APPARATUS PATENTED FOR PRODUCING BULKY YARNS —New apparatus for the production of bulky yarns invented by Harold Lewis Martyn of Allesley, Coventry, England, has been granted U.S. Patent No. 2,997,771, which the inventor has assigned to Courtaulds Limited, London, England.

The new patent relates to a jet suitable for the production of a bulky yarn from a continuous filament yarn. The jet comprises a hollow body portion having an inlet for air under pressure, a yarn exit tube leading out of the body portion, and a yarn entrance tube coaxial with the exist tube with its end extending slightly into the exit tube leaving an annular passage for air between them. The wall of the exit tube has in the immediate vicinity of the end of the entrance tube a single radial hole communicating with the interior of the hollow body portion. The air inlet is adapted to direct entering air towards the overlapping ends of the yarn entrance and exit tubes in a direction substantially at right angles to the common axis of the tubes.

* * *

APPARATUS PATENTED FOR BONDING FABRICS — New apparatus for bonding the yarns of an open mesh fabric together at their intersections invented by Gibson O. Etchison, Shawmut, Alabama, has been granted U.S. Patent No. 2,997,772, which the inventor has assigned to West Point Manufacturing Company, West Point, Georgia.

The new apparatus comprises a tenter, means for driving the tenter, a roll mounted in alignment with and spaced from the delivery end of the tenter, and means for heating and driving the roll at a speed coordinated with the speed of the tenter. Adjacent to the delivery end of the tenter are means for applying liquid bonding material to a length of fabric extending from the tenter to the roll. Radiant heating means leading the roll and disposed on both sides of the fabric path, and adjustable means are provided for directing the radiant heating means toward the fabric path at an acute angle.



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# How To Knit Type 24 Sayelle

(*Continued from Page* 19)

as Duponol RA surface active agent or Alkanol HCS surface active agent followed by a short rinse. (This scouring procedure is optional.)

5. If the knit fabrics need to be softened, apply 0.2 to 1.0 per cent of cationic softener such as Velvetol AF or Ceranine HC at 120 degrees F. for 10 minutes. Dissolve the cationic softener in boiling water before adding it to the finishing bath; or, if a crisper hand is needed, apply 0.1 to 0.3 per cent of Alon C or Baymal colloidal alumina.

6. Extract thoroughly.

7. Tumble dry at 190 degrees F. to 215 degrees F. until dry. Cool slowly to 120 degrees F.

If Orlon Sayelle bi-component acrylic fibers have been under tension when first dried after stock, top, or package dyeing, the final tumble drying temperature must exceed the first drying temperature to achieve complete and uniform bulking of the knit goods.

8. Steam knit fabrics or ready sweaters for five to six seconds on an open press to eliminate creases. Vacuum thoroughly. Creases should be eliminated during vacuuming.

It is essential that goods of Orlon Sayelle should be dried and finished in a relaxed state to avoid progressive shrinkage during home launderings or dry cleanings. Every new type of finished fabric or garment should be tested in this respect before regular production is started.

If the amount of bulk obtained by this finishing procedure is not sufficient, an additional 15 to 20 seconds steaming after extracting and before tumble drying will help in some cases to further increase the loft and bulk of fabrics made of Orlon Sayelle.

From experience, yarns or fabrics dyed in dark shades will bulk somewhat less than the light and medium shade yarns or fabrics. The differences in bulking between light and dark shades have been eliminated in the package dyeing operation by dyeing the dark shades at 225 degrees F. and the light shades at the boil.

If the piece-dye route is used, dark shade dyed goods have to be steamed in an autoclave to obtain the same degree of bulk as the light shades. This is necessary to realize equivalent bulk in all shades.

The following outline of pressure steaming will help the finisher to work out his own procedures:

1. After dyeing, the knit goods are extracted but not dried.

2. A maximum of eight wet sweaters are carefully folded on each tray covered with a light cotton fabric. Place a maximum recording thermometer in the autoclave. Load trays into the autoclave.

3. Example of suggested pressure steaming cycle: 30 seconds vacuum; seven minutes steam — five pounds gauge pressure (228 degrees F.), 30 seconds lag — 0.5 pounds gauge presure; 16 minutes steam — five pounds gauge pressure (228 degrees F.); two minutes vacuum; 30 seconds "out." If the bulking of pressure steamed garments is still not entirely satisfactory the steaming time — but not the steaming temperature — can be increased without the danger of "overbulking."

4. Tumble until dry. If the sweater or sweater parts are creased following pressure steaming, the drying temperature must exceed the highest steaming temperature by two degrees F. to three degrees F. for at least three minutes to remove the creases. The tumble dryer should be cooled to 120 degrees F. before unloading.

5. Steam complete sweaters for five to six seconds on an open press to eliminate any wrinkles. Vacuum thoroughly.

In summary, full-fashioned sweaters with outstanding aesthetics and wear performance can be produced from Orlon Sayelle Type 24 bi-component acrylic fiber.

Key points to remember in the manufacture of such garments are:

1. Use of plied yarns with a twist level sufficient for a good balance of bulk development and wear performance.

2. Fabrics must be knit loose enough to allow for fiber shrinkage and crimp development during finishing.

3. To attain maximum crimp development, the fibers must

(*Continued on Page* 45)


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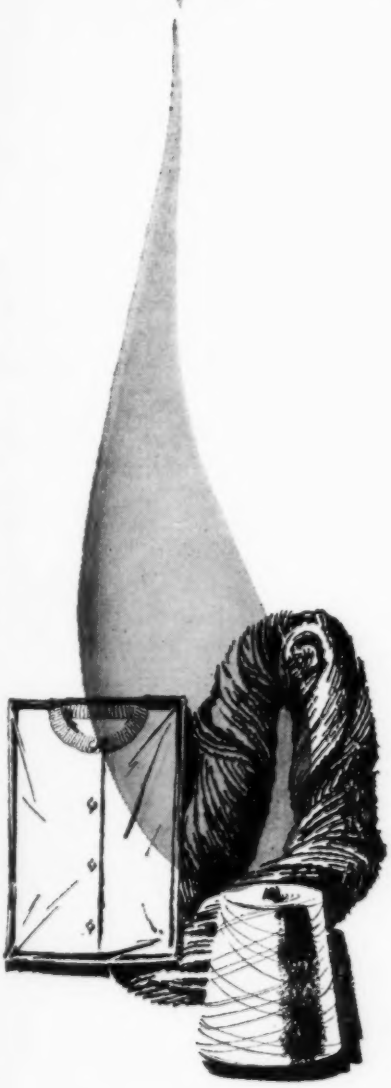

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reach the boil (at least 208 degrees F. for 15 minutes) during the bleaching or dyeing to "trigger" the inherent crimping mechanism in the fiber.

4. To achieve comparable bulk and loft, high temperature package dyeing or a post dye steaming operation of piece goods must be employed for dark shades.

5. Stock- and yarn-dyed garments must be wet out and tumble dried. Piece-dyed garments must be tumble dried to assure maximum bulk and fabric dimensional stability.

## Muff Dyeing Type 42 High-Bulk Orlon Yarn

(*Continued from Page* 25)

tively firm, nearly all of the yarn can be backwound. About 0.1 per cent of the yarn will be wasted when the package wind collapses but labor costs are at an absolute minimum. An expandable metal form or spring, or an expandable rayon cake reel pulls the crinkles from the yarn. Since the reel can turn, it helps to eliminate the shock of yarn snagging and breaking. Main disadvantage of a rolling type of take-off is the high package inertia which can cause yarn breakage at start-up.

Recently there have been a number of complaints from knitters about package-dyed yarns being lean and harsh. Usually this has been attributed to poor chemical softener penetration. However, it has been shown that this harshness is not caused by a lack of softener but rather by the flat, compressed condition of the yarn. Therefore, a very important part of the package dyeing process is to break the compressed fibers apart and restore the soft bulky hand to the yarn. To do this, stress is applied to the yarn during backwinding.

Theoretically, any means of applying stress can be used, such as by snubbing over tension bars or by drafting or drawing through positively driven rolls. A very practical method of applying stress during backwinding is to pass the yarn over opposing knife edges that provide drag with the resultant high tension. Adjustments of the distance and angles between the knife edges can be made to alter yarn tension. The amount of tension needed depends on the amount of stress required to return the yarn to its original round shape. Extremely high tensions permanently elongate the yarn and give it a high shrinkage. Satisfactory yarn tensions can be determined by steaming skeins of various stress-bulked yarns and comparing the bulk. The amount of bulking and softening of the skeins will be proportional to the stressing tension needed.

A small amount of short fiber will be removed from the yarn as fly during stressing. The highest percentage of fly that has been encountered with 2/20's worsted count yarn has been 0.5 per cent. A complete description of a method for stress-bulking is described in the Du Pont technical bulletin OR-108, "Package Dyeing of High-Bulk Orlon." A unit for stress-bulking can be purchased from Precision Machine and Development Company, New Castle.

Yarns will partially relax in reconing and they can be completely relaxed after knitting by hot tumbling or by steaming.

## New High Denier Cyanamid Staple

STAMFORD, Conn.—A valuable group of new fibers or laboratory curiosities? This is the question American Cyanamid Company is seeking to answer regarding a series of heavy denier acrylic staple fibers developed in its laboratories. The new fibers range from 20 to 80 deniers.

Probing the ultimate potential of modern acrylic fibers, the research department of Cyanamid's Fibers Division created the new staple. Under laboratory evaluation, the fibers were found to offer good dyeability, and many of the physical properties of the company's present 15 denier acrylic staple.

First announcement of the high denier staple was made by Dr. J. M. Salsbury, director of fibers research at the company's research laboratories here.

"We are most eager to have these new fibers evaluated by the textile trade," he stressed, "for they represent a development not duplicated in nature, or in any other man-made fiber."


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# European Fiber Developments

(*Continued from Page* 23)

care properties and are crease-resistant.

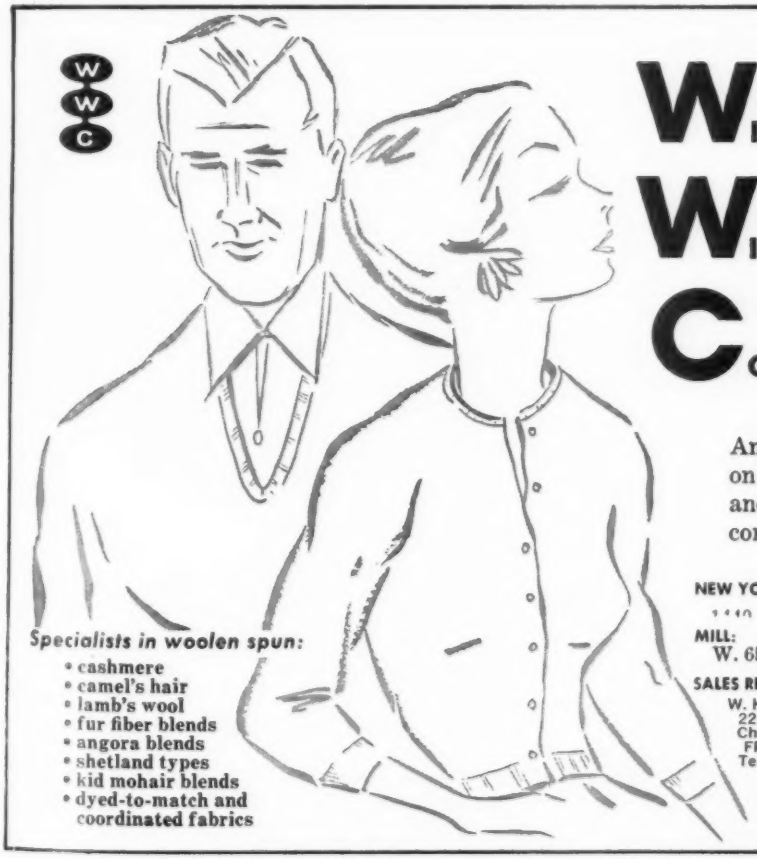
Nylon, in all its various forms, has always been a favorite with British knitters. The all-engulfing Bri-Lon/Bri-Nylon promotion scheme launched some time ago by the only current producer of nylon in the country, British Nylon Spinners Ltd., has provided a strong fillip for nylon garments, and everything from fine plain knits to patterned chunkies is reported to be doing well. However, recently there have been further developments in the nylon producing side. Until this year the only type of nylon offered by B.N.S. has been of the 66 type. But recently it was announced that small quantities of nylon 6 were being produced, initially only for industrial uses. This announcement was highlighted by further reports from both Imperial Chemical Industries Ltd., and Courtaulds Ltd., both of whom stated that they were erecting facilities to produce the polymer for nylon type 6. British Enkalon Ltd., a subsidiary of the giant A.K.U. combine located in Holland, is building a plant in Northern Ireland to produce a nylon 6 fiber, and now it is rumored that Courtaulds are planning a nylon 6 fiber plant at Wrexham (this, though, is unconfirmed — the company has said only that it will produce the polymer which of course can be used in plastics and other end uses).

Crimplene, the polyester bulked relaxed yarn produced in Britain by the Scragg process (I.C.I. hold all British rights) appears to have high prestige but a not particularly large market. It has made a success in the double jersey field, particularly in the jacquard multicolor fabrics. But there have been certain rumors about difficulties in producing self-colored fabrics. A recent Crimplene exhibition highlighted the extended applications of the yarn in the knitted outerwear trade. It is now used in double jersey fabrics, in men's, women's and children's cardigans and sweaters, in sport shirts and swimwear. One of the initial troubles with this polyester filament yarn came from snagging, particularly with the bulky knit type of garment. Now I.C.I. recommends the use of a larger denier filament for such garments.

When Acrilan was first introduced to the British market four or five years ago, Chemstrand Ltd., associate company of Chemstrand Corp. Inc., mainly confined promotion to the traditional woolen and worsted suitings industries of Yorkshire. However, over the past two years the company has been showing much greater interest in the knitted outerwear possibilities. Last year Acrilan "fleecy look" sweaters became popular, particularly with girl teen-agers and now, although this vogue has more or less continued, Acrilan is going more into the knitwear industry via the doorway created by the new British foamback fabric industry. Acrilan was used by companies such as Medlock Manufacturing Co. Ltd., and other foamback pioneers. The high pile, fleecy possibilities of Acrilan fabrics have been exploited to the full. According to Chemstrand Ltd., Acrilan fabrics are ideal for backing with foam because there is no differential stretching or shrinking as both fabric and foam are stable. Acrilan foambacks can be cut and sewn with ease, say the company, are crease-resistant and will keep their shape.

Another Acrilan development in Britain, forming a parallel with that in the U.S.A., has been the development of cross-dyeing technique for fabrics knitted from Acrilan 16. This fall will see, says one Chemstrand announcement, an influx of Acrilan jersey dresses and chunky knits for both men and women, with particular use being made of cross-dyed effects. Acrilan suedette is also heavily backed as a fashion favorite for coming seasons. Acrilan is being exported to the Continent from Chemstrand's plant at Coleraine in Northern Ireland. It is being used for knitwear in many European countries, including Sweden and Portugal.

(*Continued on Page* 49)

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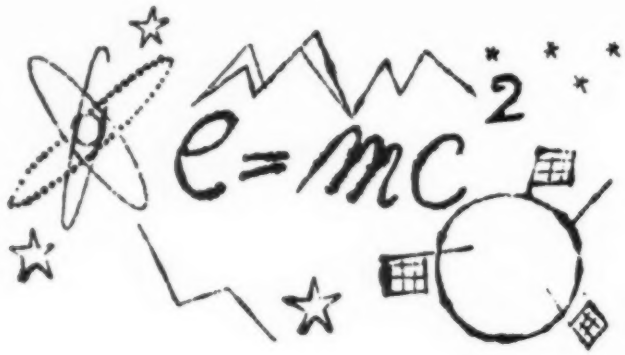


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(LORD BYRON)

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We limit the right to use Tycora to a few manufacturers in each market. We maintain a staff of designers, textile technicians, retail coordinators who make their consulting services available to our manufacturers, so that our program is all of a piece from inception to consumption.

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YARN

Some authorities say that at the moment, by weight, Orlon holds about 35 per cent of the British knitwear market if double jersey is not included. Three years ago the bulk of Orlon garments available to the British public consisted of classic sweaters produced in three denier fiber. Today this market has grown, and with it have come many other types of Orlon knitwear. Brushed interlock Orlon sweaters are popular, as are chunky knit styles (favorite denier with knitters is six denier, giving a lightweight thick-knit sweater with crisp, pleasant handle). One of the latest ideas has been promoted as the Overpull. This consists of two garments, a deep plunging chunky knit sweater worn over a high-necked sweater of three denier fiber.

An important Du Pont development has been the development of a double jersey fabric (the growth of the double jersey popularity in Britain has been phenomenal over the past few seasons) in a blend of 70 per cent Orlon and 30 per cent wool. Advantage of the blend is that it kills much of the static problem. In turn this gives a garment which does not soil so easily and which does not cling unduly. Such blend fabrics are said to be easily tailored and pressed; they are completely washable and have good shape retention.

The U. S. company, Borg Fabrics, sometime ago set up a plant at Whitstable in the South of England. Now they have introduced a range of deep pile fabrics in Orlon for use in coats and as linings.

Stockholm's Superfosfat Fabriks A.B. recently introduced a modified form of Tacryl, an acrylic fiber which has certain properties resembling those of polyester fibers and which have made it suitable for industrial applications. Although Tacryl has been produced for some time virtually all the fiber has gone into these industrial applications (papermakers' felts, and so on). However, the modified form is destined for use in the consumer market. Called Tacryl N, it is produced for spinning on the woolen, worsted, cotton and other systems and is also available in a high-shrinkage form. The fiber is produced as staple, semi-dull and bright. It has an eliptical cross-section and a smooth crinkled skin with high friction properties. The three to six denier fiber has about ten crimps to the inch. This crimp is unaffected by boiling, stretching during spinning, drafting or any other processing.

Vyrene, the elastomer fiber developed by United States Rubber Co., was introduced to Europe not long ago when Lastex Yarn & Lactron Thread Ltd. started selling it as an imported yarn. Although the British price is high, around $3.60 per pound, demand has grown steadily among swimwear manufacturers on the lookout for sheer, lightweight fabrics. Some swimwear manufacturers already have styles on the market in Vyrene, but it is rumored that most of these are in fabrics imported from the U. S. However, a plant to produce Vyrene for Europe is scheduled to start to go on stream this month in Glamorganshire, Wales.

## ASTM Book Covers Tests And Standards

PHILADELPHIA, Pa.—The American Society for Testing and Materials has published the "1961 Compilation of ASTM Standards on Textile Materials, D-13," which consists of 149 standards and tentative methods of test for widely-used products in the textile industry.

The volume contains 45 new and revised standards and tentative methods of test; several proposed methods of test; a complete index; a list of the personnel in ASTM committee D-13 on textiles, and a summation of the scopes and objectives of the committee.

Among the new standards is a list of commercial moisture regains for textile fibers. New methods of test include those for determining yard number (skein method) and dimensional change of woven and knitted textiles.

## Reference Volume Defines Textile Terms

A reference book has been issued by the fabrics department of Women's Wear Daily. It costs $1 a copy, with special rates on quantity orders.


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***NOSA Show***

# Laminates In New Guises Please Annual Market Visitors

By ALAN SIEGLER

LAMINATES have settled down to a long run in outerwear, according to exhibitors at the 19th annual show of the National Outerwear and Sportswear Association at the Trade Show Building last week. Foam is now printed and colored and bonded that way or plain to Acrilan, Antron, Dynel, Creslan, Orlon and blends.

The patterns are various and colorful; Scandinavians, for example, are thriving. The heathers and the deep brown are noticeable in the new lines. Tweed effects have been introduced.

Many exhibitors have found that manufacturers are upgrading.

Princeton Knitting Mills, Inc., showed a group of patterned prints on pile in its Country Club selection. Plaids, geometrics and stripes were well represented. Its Kunjo fabrics were straight pile or shearling. The firm banks heavily on prints. A spokesman said the only solid pile is Kunjo and that no straight pile will be sold.

Animal prints—pelts of leopards and other jungle beasts—were shown in the Safari collection. Border designs and border stripings were featured.

Antron suedes were prominent in the Astrotex group, the laminates on Scottfoam. Antron fleece was shown for its luster as lining or shell.

The line is coordinated, a spokesman said, and manufacturers have been buying on that basis.

Union Carbide Chemicals Co. showed 100 per cent Dynel shearling laminated with Scottfoam, a nylon suede for self-facing, a long-haired shaggy of Dynel and Verel, a collar and boot trim in bright shades of 100 per cent Dynel, a long-haired fox that simulates the wolf hair of Arctic parkas, a brushed sweater fabric of 50 per cent solution-dyed Dynel, wool and mohair, a novelty crepe of 50 per cent wool and 50 per cent Dynel for dimensional stability, and a double-faced pile made with Dynel backing.

Strauss Knitting Mills, Incorporated, reported that knit trim garments in plain and subtle fancies are running well for 1962. A spokesman said there was quite a bit of bulky business but in the medium weights. "In spite of our not having laminates, our business has held up."

Knits are being used for more purposes than ever — such as side panels for easy action.

The laminators were active as usual. Allied Polymer Corp. was pushing colored foam. Reeves Brothers, Inc., with its Reevair — "a waterproof foam that breathes" — is featuring 100 per cent nylon suede and 40 and 70 denier brushed Antrons.

Scott Paper Company, showed its Scottfoam bonded to 80-20 Orlon and wool, 61-39 cotton and rayon boucle, a cross knit and a crepe of solution-dyed Acrilan, an Antron flat, an Orlon rib, and a brushed Antron.

Its promotion is under the rubric, The Light Fantastic, and is backed up by a hangtag which stands for quality control tests.

Among the trim firms was Minnesota Knitting Mills showing three weights of fabric — light, medium and jumbo—in a range from all cotton to wool and nylon and stitches from plain rib to Swiss rib to novelties. There was a lot of pattern work on double half cardigans and wristlets of various yarns and weights.

The firm featured new patterns and new applications with rubber, two-way stretch nylons and athletic stripes ("always a backbone," a spokesman said). Jumbo patterns appeared in basic stitches and jumbo half cardigans in plain 1 x 1 rib.

Aero-Knit Mills, Inc., is experimenting with laminates of Zefran and linen, bulky Caprolan nylon and others. It showed cotton laminates for outershells of jackets and laminated burlap for women's wear, which it is attempting to introduce into men's and boys' sport jackets.

Eastman Chemical Products, Inc., showed its Kodel with wool, 35-65, in a sweater which was reported as doing well.

Fair-Tex Mills, Inc., was high on Creslan in double and single knits. It showed 100 per cent Creslan for outerwear and a group of Creslan double knits, as well as 100 per cent nylon fleece for outerwear and linings, women's stretch terries, laminated Orlon, wool and cotton, and a 100 per cent Orlon suede for skiwear.

American Cyanamid Company displayed Creslan laminates for men's sportswear and outerwear, which will be promoted under the slogan "It's What's On Top That Counts." The mills included: Fair-Tex as well as Originit Fabrics, Domestic Lace, Princeton Mills, Abaco and Earl Loom.

Men's wear created by Maurice Levin, designer for Cyanamid's fibers division, featured giant carpet plaids and new pile fabric constructions for both linings and shell fabrics.

Previews of TV commercials for the CBS show "Eyewitness" featured pile fabrics along with samples of counter cards and TV merchandise news letters supporting the commercials at the retail level.

Quality was the theme at Howard S. Baron, Inc. "We believe," Mr. Baron said, "in the knit look in contrast to laminated tricots. We believe in the European knitted look, the rough look instead of the shiny look of lower-priced merchandise. Volume goods lose their individuality."

He reported that manufacturers are coming back to quality. His line features bulky wool and cotton heathers and a McGregor-Doniger, Inc., jacket in heather and the suede look. He also showed brushed acrylics with a shaggy look, an Icelandic yarn in flecked colors, bulky cottons and brushed goods in heather tones, woolen and cotton jacquard effects in heather colors, bulky cotton jacquards, stripes and Norwegians and cotton velours made on Swiss machines. Bolts of printed foam were available.

Security Mills, Inc., found its Scandinavians in demand. This year it made them on the horizontal to avoid last year's tendency to bowiness.

The firm showed a group of solids in crepe to coordinate with Scandinavian pullovers, unlaminated coatings, the staple plain ribs and tweeds for men's wear. Most of its output is Orlon, chosen for washability in children's wear, which constitutes most of its trade. Colors are bright.

Abaco Fabrics, Inc. laminates featured Antron—printed, brushed and in blends. The firm also showed nylon and acetate brushed cords, Orlon-alpaca, nylon-Arnel-alpaca, nylon and acetate suedes, Celaperm nylon fancies, nylon tricot, Orlon and wool and Turbo Orlon. A group of textured nylons in bulky stitch was introduced.

Glenoit Mills, Inc., showed 100 per cent Acrilans in 18 and 20 ounce weights, in heathers, stripes and reversibles, and a polo coat with matching Acriliner. Among the looks "that ought to be brought back," according to a spokesman is the seal look of the twenties with its football games and pocket warming flasks. To that end, Glenoit is pressing its Glenseal lining in a new dark brown cashmere coat wtih pockets.

Among its other displays were Verel and Orlon Curleé, the sherling look; Dynel and wool with a dry, flat look for inside and out and Glenfluffy, another 100 per cent Acrilan, in blended colors, including Iron Mountain copper, and 100 per cent Dynel for collars, a dense pile in gray, brown or black that looks like mouton.

Cone mills, Inc., shows plaid, floral, striped and geometric knits to coordinate with wovens, as well as sweat shirt fabric—all of 100 per cent Cone cotton.

Tweed and luster was the theme of the Malden Mills Sales Co., Inc., exhibit. It showed patented tweeds in Orlon and Dynel base and Orlon Sayelle and a second with the same blend plus mohair. The name is Aurora. Its surface is soft and luxurious, flecked with random color.

(*Continued on Page* 73)

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**NOSA Technical Conference**

# Suggestions For Manufacturing Laminated Garments

By MARVIN BAER
Supervising Engineer, Bertrand Frank Associates, Consulting Engineers

THE recent, quick acceptance by customers of garments of foam laminated fabrics has created wide interest among apparel manufacturers. However, the hasty use of the new products and the marketing of some of it in the form of weak quality goods has caused, and still causes, difficulties in a variety of garment production areas.

As technical consultants to the National Outerwear and Sportswear Association we have undertaken a limited but, in our judgment, adequate investigation among a group of both suppliers and client outerwear manufacturers. Our purpose has been to aid the industry's progress in the use of foam laminated fabrics.

The following report covers salient areas ranging from the material itself through garment production and shipping. It touches on the problems encountered in making apparel of laminates and suggest the best current thinking among producers for the resolution of these problems.

**Raw Material** — There presently are no adequate industry-wide quality criteria for laminated fabrics although individual firms do have such standards. The apparel trade is handicapped without an established set of tolerances for defined defects. The current rush to laminates has allowed some relatively unqualified producers to enter this field and to capitalize on this lack of standards. The setting up of industry-wide quality requirements can only serve to upgrade the questionable products a few people are presently providing and add to the consumer acceptance of laminates. Failure of the textile industry to improve this situation may well undermine a soaring business.

Foam laminates can come to the manufacturer from one or all of these sources:

1. Vertical laminators, mills that do their own laminating. These people work primarily for their own account. They can and usually do inspect their goods before and after laminating. Quality control features here can be at their best, covering the entire procedure.

2. Specialty laminators, mills that ship their fabrics out to be laminated. These mills can have their usual, in-plant quality control program on fabric and may have an inspection procedure for the final product occurring at the laminating location, or possibly at their warehouse.

3. Specialty laminating jobbers. They buy goods, have it delivered directly to a laminator and may "drop-ship" from the laminator the garment maker. The jobber of poor ethics thus may if he chooses, never actually examine the laminated fabrics with which he deals. Fortunately such people seem to be fewer and fewer in number.

**Foam** — The polyurethane foam itself is shaped in either of two different processes before laminating to the surface cloth, whether that cloth be knit or woven, of synthetic or natural fibers.

First let us recognize that the foam-making process results in long, rectangular blocks of varying widths, the widths approximately corresponding to that of the piece goods to which the foam is to be laminated. (Foam is the result of the chemical reaction of di-isocyanate with a glycol in the presence of a catalyst.)

1. Slicing. In this process the foam is slit from one end to the other in succeeding cuts of desired thickness much like a super-market's slicing of a loaf of cheese. The sliced foam is butted end to end and joined typically, with the use of a hot wire. The butt usually is a problem only when dealing with jersey or tricot. In these cases a standard, commercial yardage allowance may be made.

2. Peeling. This process is similar to "unrolling" wood for sheets of plywood. The foam is cut from the long side, around and around toward the center in a long, wide strip. This method provides considerably more length between butted ends than slicing.

Urethane foam usually ranges in thickness from 1/16 inch to ⅛ inch and up to 450 yards in length and 36 inches to 70 inches wide.

It is well to note that for the most part, major suppliers of polyurethane sheeting do not themselves laminate their foam to fabric. This is the function of the laminators.

**Laminating** — Now for the actual laminating. There are currently two basic methods of laminating foam to fabric.

1. Heat laminating, the primary method. Heat, through the use of a butane gas flame, is applied to the foam with some "burn off" of the surface. The melted, tacky foam is cooled slightly and fed with the fabric between rollers exerting pressure. The fabric thus is fused to the polyurethane.

2. Adhesive laminating, the new and promising method. In one process, points or "jets" approximately ⅛ inch apart are brought into contact with the foam depositing a glue that serves as the bonding agent for the fabric and the foam. Roller, knife and dual chemical (base and catalyst activator) processes also are under development.

Of the two types of laminating available a number of the people surveyed preferred the adhesive method though relatively little such goods seems to be available. They specifically mentioned the strength and the evenness of the bond. Several users of the heat laminate goods pointed to the occasional varying of thickness caused by this process. Also, flame lamination is costly both in foam that is burnt away and the inability to apply silicone finishes before lamination, the simplest point in the process.

Many laminators are now adding the desired, silicone treatment to the foam during or after the laminating process to ease processing in the sewing room. Garment manufacturers find this treated foam easier to work with than untreated polyurethane.

The shrinkage problem seems to be an individual one. In most instances it is negligiblle for the foam does not shrink, though the fabric may. One manufacturer did report a shrinkage problem so severe that it was necessary to test part of every individual piece of goods on a steam press before any cutting was done.

**Receiving and Storing Foam Laminates**—We have not found any special needs in the warehousing of laminates relative to storage atmosphere conditions; nor have we found any experiences of decay, decomposition or growing brittleness of material. However, there is an oxidation factor which turns the white foam to a golden color. It can be troublesome. This is particuarly important with white jersey, tricot or any fabric having a "peek-through" quality.

We suggest that foam be handled in the same way regular piece goods are handled with one reservation. Do not stand knit laminates on end as the width has a tendency to shrink.

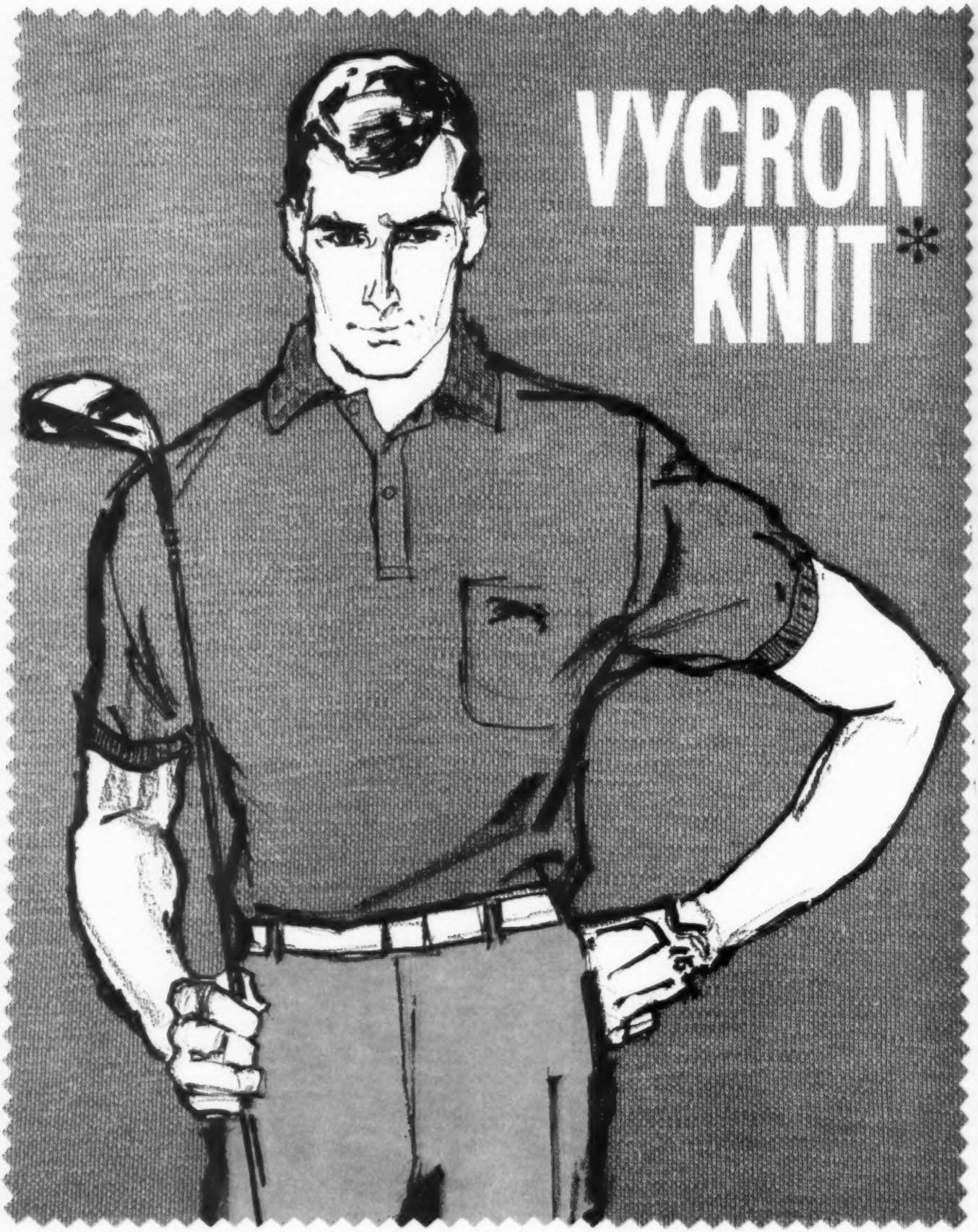
For ease of handling and reduced storage space one source of laminates ships the material in a compressed state thus removing most of the "air" normally involved in handling this bulky material. Perhaps other suppliers will do this in time.

**Cutting and Spreading**—The majority of people with whom we spoke spread foam one way, either face up or face down. We normally suggest you spread laminates with the face fabric up so imperfections can be detected during spreading. Care must be exercised when spreading to prevent the stretching of the goods. A tensionless spreader can be used to some advantage if handled carefully.

Two of our clients are successfully laying-up foam goods

(*Continued on Page* 69)

**Text of paper delivered by Mr. Baer at seminar on laminated fabrics conducted by Bertrand Frank Associates on October 28 in conjunction with NOSA convention and suppliers exhibit.**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**the fabric:** A breathe-easy knit of 50% VYCRON polyester and 50% combed cotton that bounces back from a dunking ready to go round again. Says Marlboro: "This VYCRON/cotton knit has all the abilities—wearability, washability, durability—and salability."

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***Manchester Knitting Machinery Show***

# Wide Range Of Sewing, Ancillary Equipment On Display

**This is the second of the series of reports reviewing knitting equipment developments seen at the 1961 International Knitting Machinery and Accessories Exhibition held at Belle Vue in Manchester, England, on October 11-21. Subsequent articles will discuss V-bed flat and full-fashioning machines, dyeing and finishing equipment.**

ALTHOUGH there was not a great deal new as far as knitting units go at the International Knitting Machinery and Accessories Exhibition, the range of equipment shown for allied sectors of the trade were many and varied. Sewing machine makers were well represented as were the builders of ancillary equipment. Many well-known U.S. companies took part.

Automatic Steam Products Corp., New York City for example showed a Sussman portable automatic steam iron unit combining a steam generator and a couple of irons. A Leicester, England, company showed a high speed pedestal looping machine designed to eliminate leaning or bending on the part of the operative. This was the Mathbirk unit, built by Frederick W. Beck. By slightly turning her foot, the operative can bring any part of the dial in front of her. Threading, and changing of yarn are done from a sitting position. Looping is done at eye-level; the height of the stand is adjustable. The same company, by arrangement with Stibbe & Co. Ltd., showed a Sotco model P looping machine with a Beck compound looper/spreader device. This unit, by the simple action of the looper mechanism, makes possible higher linking unit speeds.

The Bellow Machine Co., Ltd., Leicester, showed a wide range of machines for fabricatory garments of various types. The range included equipment built by U.S. and Continental manufacturers represented by Bellow. A portable bandknite machine, Model 770, by Karl Bullmer, West Germany, can be used in conjunction with ordinary portable cutting machines to completely eliminate the need to remove the more intricate sections of the lay for cutting on a more permanently positioned bandknife.

On the Bellow stand, Ginsberg Machine Co. showed its Tape-Master unit for cutting cardigans, sewing button-holing tapes, and sewing button tapes simultaneously. Electric cutting machines by H. Maimin & Co., Inc., U.S.A., were also displayed on the stand. A lockstitch machine that operates at 5,000 stitches per minute, on the Bellow stand, is made by G.M. Pfaff AG., West Germany.

Rothenborg A/S, of Copenhagen, is also represented by Bellow. This company showed an automatic stacker with cutting attachments which was described as a great step forward in speeding the disposal of pieces of work after sewing. With one solenoid action, the cutting attachment releases the garment from the machine, and the stacker automatically removes it and stores it ready for bundling together with the rest of the work bundle.

Cutting attachments to be used with the unit can be guillotine chain cutters, overlock chains, double lock-stitch chains, and narrow tapes, or sliding knife attachments for cutting bindings, bands, elastics and so on.

On another stand, Chandler Machine Co., U.S.A., showed high speed button sewing machines for shank buttons and flat buttons.

A Danish firm, Eltex, showed a lace dividing and scalloping machine for curved Raschel lace. This had a feed speed of up to 120 feet per minute. Maximum capacity of the unit is forty rows across the width and output is up to 8,750 yards of finished-divided and scalloped lace per hour. With two operatives, the machine is said to be the equal of twenty operatives working by hand. Infinitely variable drives, servo-controlled, facilitate the best speed of operation to be selected for various patterns. Cutting can be by knives or heated cutters (if cutters are used their temperatures can be altered individually or collectively).

An interesting selvedge stiffener was shown on the stand of Erhardt & Leimer OHG., West Germany. This was called KVS1, and is a device to apply a liquid stiffening agent called Texurin to the edges of tubular fabrics to stop curling. Compressed air is used to spray the liquid on to the fabric where it is immediately dried by a current of hot air. The device, incorporating the sprayer and hot air nozzle, is mounted on the knitting machine and is connected by hose to a blower, air heater and liquid tank.

An Italian company well-known internationally for its looping machines, Exacta Officina Meccanica Specializzata, showed several new models in addition to established units.

The Exacta Sprint is one of these new models. It has a curved needle suitable for elastic yarns besides more conventional yarns such as cotton, wool and silk. A solid, well-balanced construction permits high speeds; its five-speed gear is synchronized in an oil bath. It has a cutter-brush device with a second brush and chain cutter. A small compressor keeps the cutter-brush lint free.

Two other new models shown were the Exact Visionmatic, and the Exacta Ultra Visionmatic. Both have the free dial plan which can be used as a work plan. A rubber-coated ring enables the rotary model to be turned with the knees. The speed regulator is treadle driven, and a lever stops the machine by disengaging the dial and halting the needle at the same time. The needle is brought to the correct position and the dial engaged at the right moment when starting in both models.

A fourth new model is called the Exactra M Supra. This has a large dial. Its straight needle is outside the point dial. The speed regulator has two speeds.

Hilber & Co. KG, showed a range of open dial outerwear looping machine, in gauges 5/5, 7/7, 12/12 and 14/15, each of which has interchangeable dials. It is said that these dials can be changed at exceptional speed.

A range of looping machines demonstrated by Kemptener Maschinefabrik GmbH, West Germany, included the KMF class 105 large dial circular linking machine. This unit has the needle working from the inside to the outside; a modified model called 105A has the needle working from the outside inward. A special attachment is incorporated in this latter type to cut out the problem of needle breakage and damage to the

(*Continued on Page 59*)

## BRITISH EDITOR HITS MANCHESTER LODGINGS

AN editorial in the current issue of Skinner's Silk & Rayon Record, British trade periodical, will strike a response among American visitors to the recent knitting machinery show in Manchester. The editorial criticized the "cramped accommodation, dismal meals, cold rooms, at what by even North American standards were high prices."

"Little wonder that so many visitors, originally here for the duration of the exhibition, returned home after only two or three uncomfortable, expensive days," it said. "It seems hardly fair to pay well over £5 ($19.00) per night for room with bath, then be expected to place shillings in a meter to get warm . . . A Swedish visitor went home on the third day after paying over £9 ($25.00) per night for an ordinary room with bath.

"As Manchester men, we flinched when during the opening ceremonies of the exhibition the Lord Mayor apologized to visitors for the lack of hotel accommodation, explaining that several Manchester hotels were damaged during the war. In the audience were men from the entirely rebuilt cities of Germany, Japan, Czechoslovakia, France and Belgium."

The editors called on the organizers of future exhibitions to "make sure there is sufficient accommodation of reasonable price and standard in the vicinity." Otherwise, they concluded, "visitors won't be eager to make the pilgrimage."

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**PRESENTS**

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point ring. Both versions can do single and double chain stitch linking.

High quality looping at high speeds is the function of the Carousel 100Z, shown by Kettma Hamburger Kettel-Maschinenfabrik E. Hahn KG., West Germany. It has 6/6 points per inch, and the whole of the stand column is rotated by the operative's foot. The unit can do single or double thread chain stitching, change-over taking less than a half minute. Stop motions actuate when a stitch breaks or drops. Speeds vary between 50 and 450 stitches per minute.

Man-Sew Corp., U.S.A. showed a range of fancy stitch units and attachments for decorative effects.

Phillips & Sons (Manchester) Ltd., exhibited a cloth spreading machine which allows the cutting of circular knit fabrics in one simple operation. Herbert Queck, West Germany, showed a novel testing device which was basically a plexiglass bust, over which the garment is slipped, which can be turned round while an internal illumination highlights any faults.

Reece Machinery Co., Ltd., Britain, exhibited the S2 Tacking and Automatic Sewing Machine, a unit which, it is claimed, can cope with a wide range of sewing and high speed tacking jobs normally requiring a range of equipment. Work is limited to three movements for the operative: positioning the job; depressing the starting pedal; extracting the finished work.

The unit will tackle strap staying, locking overseam ends, dart sewing, joining and pleat setting, anchoring draw strings, and miscellaneous tacking.

A double locked chain stitch machine, with or without an edge trimming device, capable of working at speeds up to 6,000 stitches per minute, was introduced by S.p.A. Virginio Rimoldi & Co., Italy. This unit will be called Class 30. This was only one of a large variety of new equipment unveiled by the company. Other units included a Class 63 model designed for multiple needle interlock work and said to be extremely fast and quiet in operation. There was also shown a new Class 64 model for double locked chain stitch work, with variations designed for single needle straight seaming at 5,000 stitches per minute. Another new group, Class 64 model for double locked chain stitch work, with variations designed for single needle straight seaming at 5,000 stitches per minute. Another new group, Class 65, consisted of elasticating models offering precision metering devices working at high speed. A low price overlock unit replacing the established Class 27 range is now called Class 28.

Singer Sewing Machine Co., on the stand of the British associate company, showed the latest models in its 246K range of overedging machine, now operating at increased speeds.

The Class 217 models exhibited by Strobel & Sohne, West Germany, were described as two-thread blindstitch models operating at up to 1,400 stitches per minute. The units have plungers coupled with knee-lifters; they produce a very elastic seam; and four types of stitch can be put in by one unit. It was said that the machines are particularly suitable for hemming sleeves on cardigans, and for felling zip fasteners and pockets. The greatest advantage of the plunger is that it can be lowered to facilitate the introduction of the material as well as during the extraction.

Union Special Machine Co. Ltd., an associate of the U.S. company, showed an extensive range of equipment representatives of the vast variety the company builds. This included their 39500W two needle four thread overlock machine, ther 39500H single needle two thread welter machines, and two single needle machines; 39500AF with the high throw-over to accommodate heavy duty overlock, and the 39500AB three thread overlock unit with Tronics-Trimmer.

Willcox & Gibbs Sewing Machine Co., Ltd., showed several sewing machines, including the Superlock 813C1 for seaming on to interlock and nylon knitwear, the Overlock 33TSCJV for thick seaming knitwear (this is equipped with a tape guiding control). One particularly interesting unit on this company's stand was the Rotalock 1001-30, a plain stitch machine with a low friction Teflon foot specially designed for sewing laminated foam fabrics.

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**JAN 8** — **"SEWING, CUTTING & PRESSING REVIEW"**
Survey of major developments in fabricating equipment for knitwear cutting, sewing and press-

**AUG 6** — **"OPENING OF SWIMWEAR LINES"**
A "Style" special issue—timed just right—for the presentation of new ladies', men's and chil-

| | | |
|---|---|---|
| **JAN. 8** | **"SEWING, CUTTING & PRESSING REVIEW"** | Survey of major developments in fabricating equipment for knitwear cutting, sewing and pressing. Latest techniques for automating and speeding output in sewing, cutting and pressing departments will be evaluated. |
| **JAN. 29** | **"FALL KNIT GOODS REVIEW"** | A comprehensive resume of major Fall knit goods offerings available to the primary market, coincident with the 15th Fall Market Week of the Knitwear Mill Representatives Assn. Jan. 28-Feb. 1 . . . Bonus Distribution—2,000. |
| **FEB. 12** | **"DOUBLE KNITS AND KNIT YARDGOODS"** | Survey of latest machines available for the manufacture of double knit garment lengths and yardgoods, new double knit yarns and dyeing and finishing trends. Will also include a comprehensive double knit fabrics display. |
| **FEB. 26** | **"WARP KNITTING REVIEW"** | This issue will highlight latest developments in Raschel, tricot, Simplex knitting equipment; growing importance of warp knits in outer apparel; and new techniques for dyeing and finishing of —all will be reported on in detail. |
| **MAR. 12** | **"TEXTILE CHEMICALS FOR KNIT GOODS"** | Spotlighting the increased role which such textile auxiliaries as cationic softeners, synthetic detergents, water repellents and sanitizing agents, fabric weighters and shrinkage control resins play in the knitwear field. |
| **APR. 9** | **"MILL MODERNIZATION REVIEW"** | Presenting a "Knitting Arts Exhibition In Print," featuring all new knitting, winding, sewing, finishing, pressing and auxiliary equipment introduced within the past year—for improved knitting mill production and efficiency. |
| **MAY 14** | **"COTTON YARNS & KNITTED FABRIC REVIEW"** | Highlighting the role of cotton yarn in knitwear . . . reviewing all new knitted fabric offerings of cotton and other natural and synthetic fibers . . . published in conjunction with "National Cotton Week," May 14-19. |
| **JUNE 11** | **"LAMINATED KNITS REVIEW"** | Trends in use of laminated knitted fabrics; new methods of bonding knitted cloth to urethane foam; techniques for cutting and sewing foam-backed knit fabrics; finishes for laminated knits —all will be reported on in detail. |
| **JUNE 25** | **"MATERIALS HANDLING REVIEW"** | The growing importance of materials handling systems in knitwear mills' shipping, storage and other departments will be discussed. Particular attention also will be paid to conveyor systems for sewing rooms. |
| **JULY 2** | **"INDUSTRIAL KNITTED FABRICS REVIEW"** | Knitwear today is going into a wide range of industrial uses in addition to apparel. The role of knits in automotive carpeting, in backing for vinyl, in draperies, upholstery and surgical products will be analyzed in depth. |
| **JULY 16** | **"PREVIEW OF NEW SWIMWEAR FABRIC LINES"** | A pre-season delineation of rigid and elasticized woven and knitted swimwear fabrics, made from natural and synthetic fibers . . . plus a retail sales report on 1962 swimwear styles . . . initial swimwear promotion issue to the primary market. |
| **AUG. 6** | **"OPENING OF SWIMWEAR LINES"** | A "Style" special issue—timed just right—for the presentation of new ladies', men's and children's swim suit offerings to the primary market . . . augmented distribution to insure complete market coverage. |
| **AUG. 13** | **"RIBBONS, BUTTONS & TRIMMINGS REVIEW"** | A comprehensive discussion—and extensive pictorial display—of new types of ribbons, buttons, threads, knitted trimmings, accessories and zippers for knitwear and swimwear, drawn from the trade's leading suppliers. |
| **AUG. 27** | **"DYEING & WET PROCESSING REVIEW"** | Reviewing all late developments in processing and dyeing of natural and synthetic yarns and knitted fabrics. Attention also will be given to chemicals and dyestuffs used for yarns and knitwear fabrics and garments. |
| **SEP. 10** | **"KNIT SHIRT, SWIMWEAR & FABRIC LINES"** | The major issue for knit shirt manufacturers catering to the primary market . . . also featuring knitted and woven fabric offerings . . . summary promotion issue for swimwear firms . . . Bonus Distribution—2,000. |
| **OCT. 1** | **"KNITTING MILL EQUIPMENT REVIEW"** | Bringing the industry up-to-date on new developments in knitting machinery, and winding, sewing, cloth-cutting, conditioning, pressing, finishing and other equipment and supplies—available from domestic and foreign sources. |
| **OCT. 15** | **"WOOL & SPECIALTY FIBERS REVIEW"** | Interpreting the "Wool Story" for knitwear readers . . . charting the many new, exciting developments responsible for increased wool appeal and usage . . . authoritative information on wool tops, yarns, fabrics, etc. |
| **OCT. 29** | **"FACTORING & MILL FINANCING REVIEW"** | Continuing our editorial program to explain the mechanics of Factoring and how knit goods manufacturers and jobbers can profit from its use . . . plus authoritative information on inventory and equipment financing. |
| **NOV. 5** | **"SYNTHETIC, NOVELTY & BLEND YARNS REVIEW"** | Pin-pointing the great technological developments streaming out of laboratories of fiber and yarn suppliers . . . stressing the role of synthetics, novelties and blends for knitwear . . . "An Encyclopedia of Synthetic Information." |
| **NOV. 19** | **"WHOLESALE SPRING SWEATER LINES"** | A review of the sweater lines which mills and selling agents catering to the wholesale trade will be offering for the Spring 1963 season . . . summary promotion issue for knit shirt producers . . . Bonus Distribution — 2,000. |
| **DEC. 3** | **"MILL QUALITY CONTROL REVIEW"** | Quality control procedures and devices suitable for use in plants of spinners of knitting yarns and manufacturers of knitted yardgoods and knitted garments will be emphasized. Actual "how-to" Case Studies will be incorporated. |
| **DEC. 24** | **"REVIEW & FORECAST"** | An overall report of the operations of the knitted outerwear trade and its allied supply fields during the past year . . . presenting "The Outlook for the New Year" . . . an invaluable "Guide to Future Planning." |

# 1962 KNITTED OUTERWEAR YEARBOOK—MAY 3

Published in conjunction with the 44th Annual Convention of the National Knitted Outerwear Association at the Waldorf-Astoria, New York City. Sent by mail to all TIMES subscribers. And, in addition, the "Yearbook" is personally presented to every executive attending the Convention. The "Yearbook" is the Knitwear Industry's only specialized Directory, Technical Manual and Buyers' Guide. It is acknowledged to be the trade's most useful reference tool and has a usual life span of at least a year.

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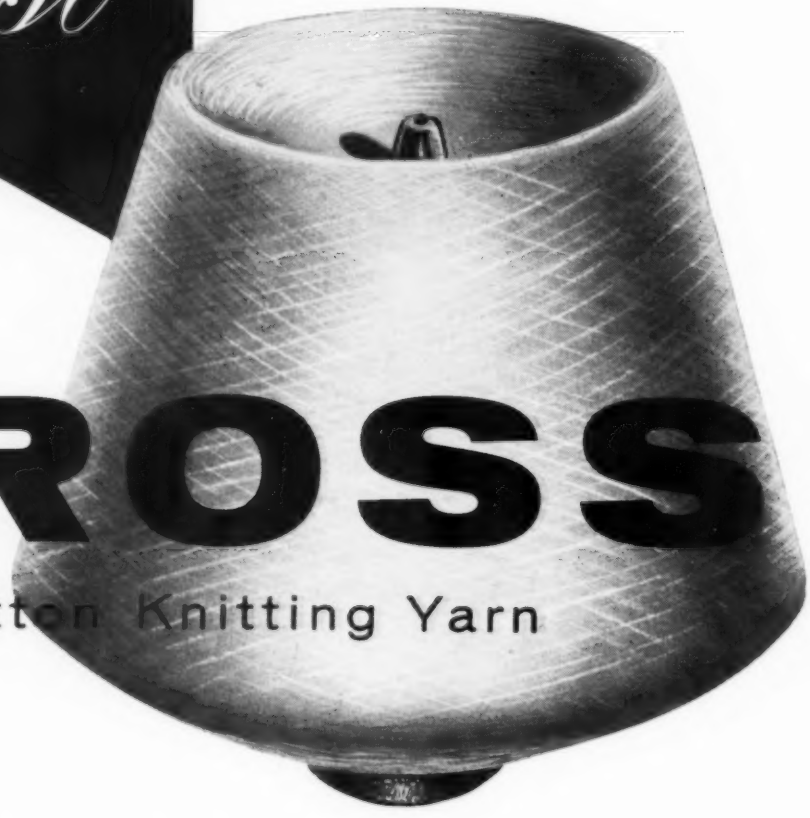

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## Developments In Finishing Of Synthetic Knits

(*Continued from Page* 29)

of lace curtainings is now dyed on a thermo-solvent process, which is quite a simple operation and, being a continuous process, is most economic. At the same time, it presents certain advantages inasmuch as the curtaining thus treated does not so easily attract dirt and is much easier to clean.

**Two-color effects**—It is possible to make excellent use of the different affinity to dyes of the various synthetic fibers available, so as to obtain two-color effects in one single dyeing operation. Thus, for instance, acid dyes will take on polyamides but not on polyesters, the result being that, when an acid dye is used, the latter still remain white. If polyamide and polyester threads are used for the warp in warp knitting, it is thus possible, after the dyeing operation, to obtain a longitudinal stripe effect, the design of which can be varied according to the set-up.

Polyamides and polyesters can be dyed with disperse dyes and then, in addition, the Perlon can be over-dyed with an acid dye. Thus, for instance, if the material is first dyed yellow with a disperse dye and the polyamide is then over-dyed with a blue acid dye, a yellow and green effect is obtained.

The affinity of the polyamide for disperse dyes being greater than that of the polyester, the polyamide dyes a darker shade. The dyeing effect can, however, also be reversed, if an intensive dyeing of the polyester fibers is effected by the use of a suitable carrier and the polyamide is then de-colorized. On decolorization by the alkali-reductive process, the polyester fibers will release the dye they have absorbed.

In addition, the varying shrink properties of the different synthetic fibers can be utilized to produce various effects. Synthetic fibers can, within limits, be produced with any desired shrink potential, from highly shrinkable yarns or fibers to stabilize products which will virtually not shrink at all.

(*Continued on Page* 67)


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RUSSELL GANT CO., Burlington, N. C. (for South)

*DuPont's Acrylic Fiber

**Anti-mildew and anti-bacteria finish** — New finishes have recently been much discussed and advertised for personal linen, stockings etc., to prevent the development of bacteria, mildew etc. A finish of this nature does seem highly desirable to counteract foot perspiration, which is very common. On the other hand the universal adoption of such finishes is a matter of considerable debate according to hygienic experts, as they are afraid that such a finish may prove detrimental to otherwise innocuous bacteria on the surface of the skin and that, under certain conditions, the natural balance may be so disturbed that highly undesirable germs with very strong powers of resistance may gain a decisive upper hand.

**Fish nets**—One very interesting line outside the field of clothing textiles is that of fish nets. Knotless fish nets are produced on the Raschel machine. If fish nets are stabilized on a stenter for 30 seconds at 190° C. under stretch, the most favorable stretch and strength values are obtained with a stretch of six per cent. The stability of the mesh and the shape of the mesh of fish nets produced on these lines is exceedingly good, with a complete absence of any undesirable tendency to shrink.

The makers of fish nets and the fisher folk themselves have been accustomed to impregnate the nets with an asphalt-tar product, this also serving to stabilize the knots in the nets. This is, of course, not necessary in the case of knotless fish nets, but, despite this, a liking still persists for impregnating such nets, too, to give them the certain accustomed degree of stiffness.

## Two New Sales Managers Appointed By Sandoz

Raymond J. Mitchell has been promoted to sales manager for the New York District sales office of Sandoz, Inc. He joined the Sandoz organization in 1939 and has been sales manager of the Cincinnati district sales office for the past seven years.

Harvey G. Gendreau succeeds Mr. Mitchell as sales manager of the Cincinnati sales office.

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## How To Fabricate Laminated Apparel

(*Continued from Page* 53)

face to face, foam to foam. This is contrary to general industry practice. One uses a tensionless spreader operated by two men who hand lift the "catchers" and place them down gently on the goods caught under them. The other uses the normal spreading procedure.

Laminates are provided with one even-cut edge as an aid for laying-up goods.

**Cutting**—The only important suggestion for the cutting of the foam to come out of the investigation is to keep a sharp blade in the cutting machine. Actually many companies have found an improvement in the accuracy of their cutting when working with laminates.

**Sewing**—To date, the majority of the problems in making foam-backed garments have centered in the sewing room. However, they are well on the way is being overcome. But, at least one producer is certain that foam will always cost more to sew than a "regular" garment.

Producers have used on their sewing machines with success Teflon presser feet and rubber covered feed-dogs. Silicone sprays around the needle area and on the machine bed also help. All are aids in promoting the smoothness of foam movement across the table and through the machine.

Compound feed sewing machines also can be valuable in the making-up of foam laminates.

Another aid to sewing (though somewhat costly) is to insert a tape or ribbon on the foam as you stitch, thus reducing the contact friction between the foam and the sewing foot.

Some problems have occurred in the "running" during sewing of fine jersey or tricot that is laminated to foam. Although the cases are individual, solutions to these difficulties usually have been obtained by using the smallest needle possible with a small, accompanying hole in the throat plate. A needle of one of the ball types is suggested to permit the free passage of the thread through the jersey or tricot fabric and foam.

Manufacturers using bulky

(*Continued on Page* 71)


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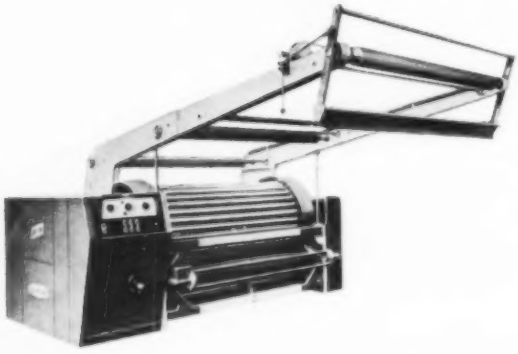

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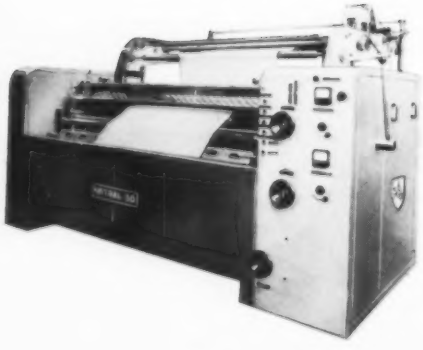

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knits laminated to foam also would do well to employ the ball-point needle. It literally moves the knit aside as it passes down through the material.

It is well to repeat here that foam treated with silicone by the laminator has proven to be a definite aid in sewing.

Seam allowances, we find, are the same as used with regular, knit or woven fabrics.

**Finishing** — Due to the inherent qualities of foam and its resilient nature little pressing is needed We have found "seam busting" to be of but slight value in under-pressing.

There seems to be no problem in the pressing of foam with a hand iron, steam press or foam press. Residual wrinkles usually come out with a shot of steam.

Some fabrics have a tendency to shine when pressed on a conventional steam press. However, when the heat level is reduced this generally is corrected, and is almost invariably solved when there is a conversion to the use of a foam press.

**Warehousing and Shipping**— In these areas the foam laminates again show to good advantage. The crease resistant qualities of the foam may well permit you to employ less care in the packing and shipping of foam garments than with traditional apparel. Hanger-pack shipping is popular but even conventionally folded garments usually arrive at the stores in salable fashion. However, the stores would do well to steam out those creases that do occur, due to tight packing.

**Conclusion** — Consumer acceptance of foam already is great and probably will increase. Suppliers would do well to develop industry-wide standards and include silicone finishes in their products as an aid to garment making. The problems initially encountered in laminate apparel production are being overcome though individual difficulties may continue for a time.

## Regal 42nd Anniversary

Regal Knitwear celebrated its 42nd anniversary on October 19. Mr. Julius Israel, one of the founders, was given a luncheon at the Empire State Club by the other members of the firm.

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# Knit Laminates Big At NOSA

(*Continued from Page* 51)

Other groups displayed included a 100 per cent Orlon with two colors, two-tone Himalayas, Antron laminated, cotton knit velours — the "Camelot cloth" — cotton stretch velours, brushed Orlon and mohair laminates and novelty boucle bulky laminates.

The color stress was camel and vicuna.

A Borg Fabric Division spokesman said the firm was emphasizing increased quality in every fabric in response to manufacturers' demand. "We have a strong program in solution-dyed Acrilan, strong reliance on Orlon and Creslan, increased density across the board and confirmed interest in brown and blue," he said. The shearling look continued strong here. The tweed look was present in force. The company introduced the former last year, but in now making it in brighter colors, having felt that last year its tones were too drab.

A resurgence of drip-dries, after a year or two of decline was reported.

"We have no prints, no plaids, no gimmicks," the spokesman said.

Chemstrand Corporation is

(*Continued on Page* 75)

**Black and white combine with Creslan in a ski outfit. The belted jacket is an experimental fabric of Creslan and wool, the lining of the hood and the cuffs are Sherpa, 100% Creslan curly pile, and the stretch slacks are Creslan and Helanca.**


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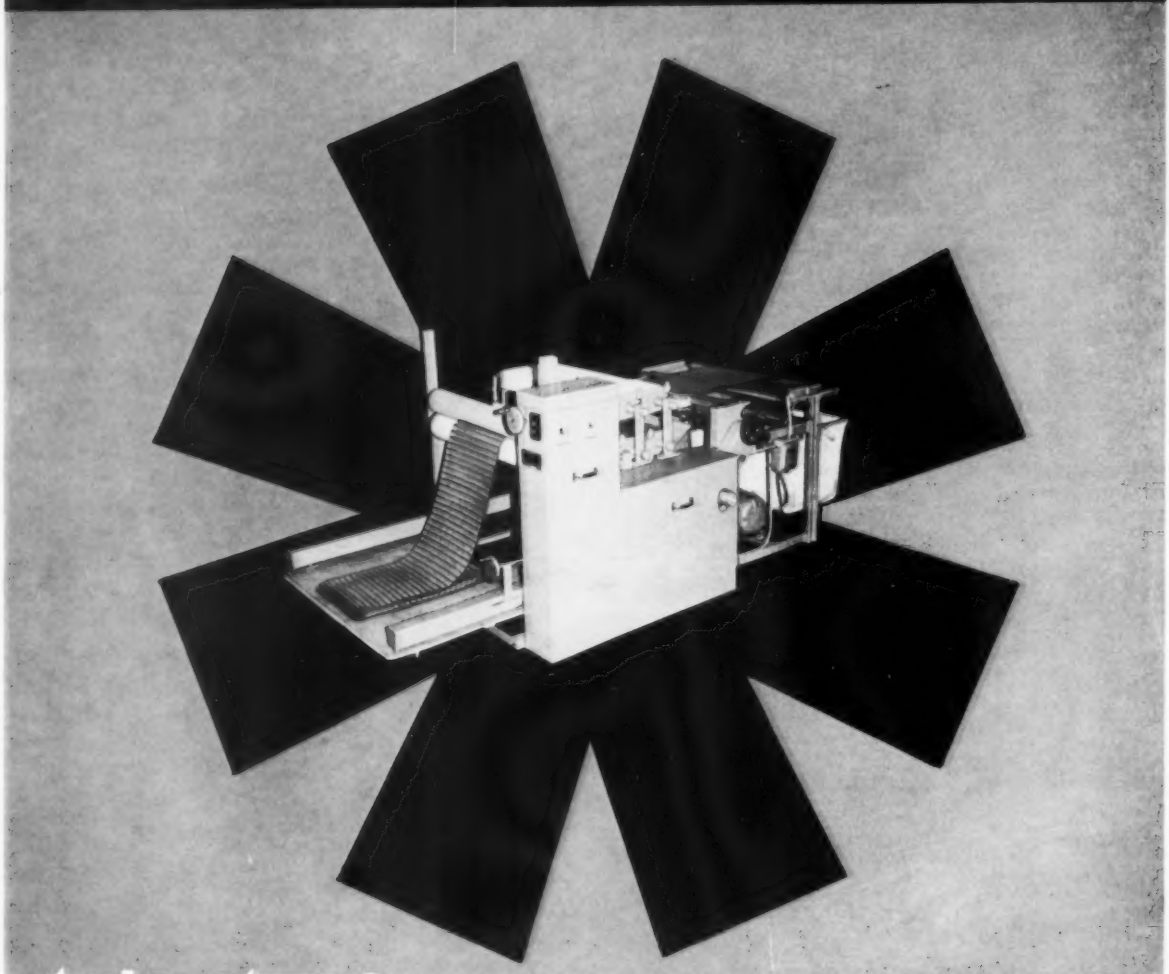

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introducing a crush-proof washable looped pile of 30 denier nylon that has hitherto been confined to shoes. A pair of sneakers made of this will wear out its soles before the tops—a tribute, the company says to the strength of the fabric in the top.

The company also showed its solution-dyed Acrilan in 15 basic colors that can be blended and worked into off shades, and its Acrilan laminated jersey.

Allen Knitting Mills, Inc., showed its laminated jerseys with printed foams for lining garments, which saves the manufacturer costs of labor and lining. Makers of men's and boys' jackets and caps have called for it in quantity.

An active number is a lightweight raincoat of nylon with a Syl-Mer finish,that can double as a coat for chilly weather.

A women's crepe stitch of Acrilan laminated to Scottfoam, has enjoyed a business boom; some 100,000 coats made of it by Natalie Green sold like hotcakes. Natalie Green this season has relinquished its exclusive hold, and Allen is selling it to other manufacturers who have pledged to maintain the price level.

**An Austrian-inspired Tyrolean jacket, designed by Maurice Levin, is in Sherpa, the curly pile of 100 per cent Creslan. The jacket piping is wool.**

Scandinavians are featured by Originit Fabrics, Inc. Last year's boucle look has been elaborated from color and white to color and color. Solids coordinate with blended cotton.


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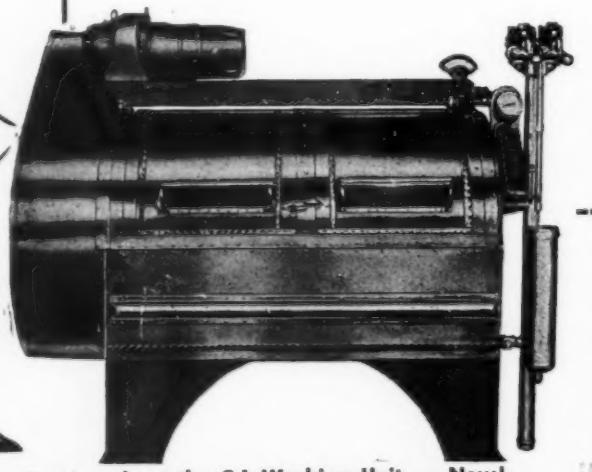

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***Men's & Boys'***

## School Trade Is Fair, But Hope High In Cleveland

By SANFORD MARKEY

CLEVELAND, O. — Mixed reaction to return-to-school sales of men's and boys' sweaters and knit goods was voiced by sales personnel in the Greater Cleveland area, but hopes continue that the overall season will be successful.

The end of the exceptionally long and hot September season is the greatest indication for a sales pickup in sweaters, but a feeling that new styling and need for sweaters will spark demand also is evident.

Buyers are reporting that "like the automotive industry, knit goods manufacturers must turn up something new each season, otherwise sales drag. A new look, or silhouette will do wonders," said several buyers.

They point to the virtual ban of the shawl collar in sales as evident for new offerings, and point to the ready demand for flat knits in Orlon, along inexpensive lines, and the V-neck and cardigan move in the classic crew-neck sweater, particularly in the college crowd, as signs that garments will sell if properly tailored and offered.

A series of stimulating promotions by Jantzen, revolving around the Frank Gifford sweater - personal appearance, appearance, helped Jantzen's Bud Hamill in realizing a sharp increase in sales this year.

May Co., which highlighted the promotion program, scored a 50 per cent sale in the "Canadian Cardigan unit." Besides the striped cardigan, Jantzen reported its alpaca knits sold well and that zipper sweaters have zipped to the front in sales demand in the $14.95 class.

Hamill also declared that colors such as orange and purple are in good volume. In pullovers, he added, "the V-neck is very good. There appears little demand, compared to a year ago, for the boat neck. Because of the fine look, as evidenced by the flat knit fine gauge sweaters will have a successful year, replacing the bulkies of a year ago."

Irv Rothstein, Lord Jeff, said "sweater business is good. Both

(*Continued on Page* 79)


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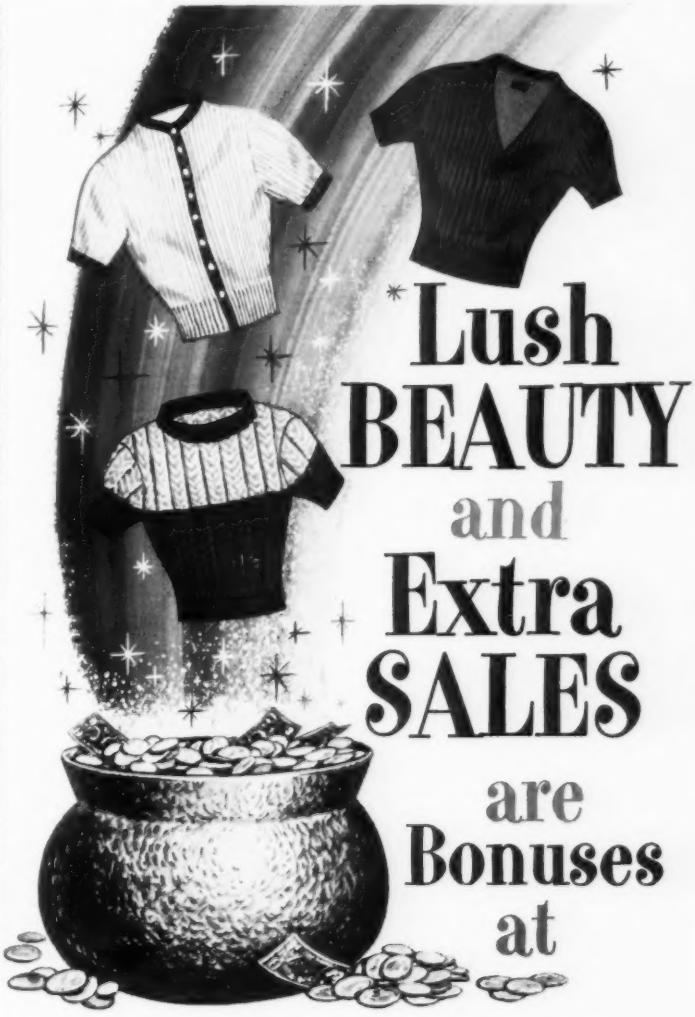

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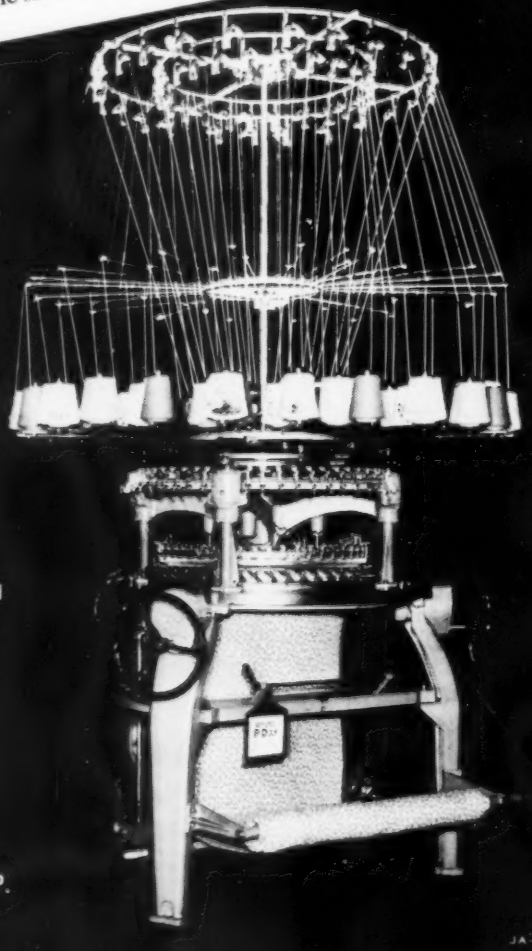

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teen-agers and the college youth has sweaters as the integral part of his wardrobe. The high-V, brushed sweater is especially favored. Cardigans, zippers, are important."

Low Beisler, Puritan, said the Welgrume line of zippers and cardigans are selling well, but noted the discount houses are making a decided move into the sweater sales picture.

Noting the mixed reaction, buyers, however, do look ahead to a strong holiday sales period. There's a conservative touch throughout the sales picture, with quiet tones the general trend, although as one major department store buyer put it, "sweaters are flatter and lighter in appearance, but there still is a decided flair in surface designs that will attract the shopper. Pattern, especially the Nordic variety, is growing in popularity and with the snows, they'll sell that much faster."

The British influence, in new six and seven button cardigans, is growing in popularity. In virtually all sweaters, pattern vies with solid color, with the cable stitch usually making a strong showing.

For boys, there's a continued strong Orlon and Dacron demand. In prices from $4 through $8, such sweaters are selling as the 80 per cent Orlon, 20 per cent wool, pullover in solid red, light blue and maize, and ski sweater in Scandinavian design, crew neck.

## Brentwood Adds To Salesman's Area

PHILADELPHIA, Pa.—Brentwood Sportswear, here, has increased the sales territory of Stuart Heyman who has been with the firm for 17 years.

Mr. Heyman's new territory will include all of New York State, except New York City, and Westchester County. His present territory which he will continue to serve includes Eastern New York, Connecticut and Rhode Island.

Milton Tauberg who formerly covered the territory has resigned. He also traveled Western Pennsylvania. Brentwood officials indicated that an appointment for that area would be made soon.

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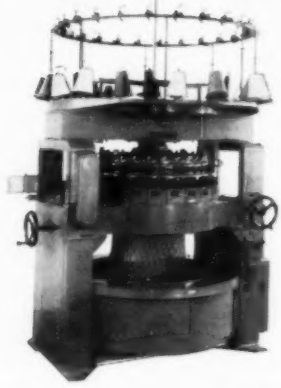

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## Men's & Boys'

# Milwaukee Sales Higher This Year Despite Weather

MILWAUKEE, Wis. — Mail orders, reorders and fill-ins are coming in much better than a year ago at this time, says Jerry Wallace, Milwaukee Knit Products.

Dealers remain cautious, however, since fall weather has been very mild in the Midwest. Sweater and knit shirt inventories at the retail level are in healthy shape because of light dealer ordering earlier in the year.

"All we need is a break in the weather and the sweater business will begin moving at a fast pace. There is a lot of confidence among our dealers. They feel sure we are headed for a strong holiday selling season."

Sweater reorders at present stress jacquard patterns in brushed wools, classic V-neck cardigans and pullovers. These styles are expected to remain strong through the holiday period, says Mr. Wallace.

Milwaukee Knit Products is also shipping a hefty quantity of fancy Orlon blazers.

## Yarn Suppliers

### M. Freed Advertising Head of Texture Yarn Co.

Maurice Freed has been appointed as director of advertising of Textured Yarn Co., Inc., producers of Tycora modified filament yarn. Mr. Freed will coordinate advertising of all manufacturers of Tycora products with Textured Yarn's advertising agency. Products of Tycora yarns include men's and women's apparel, carpeting and upholstery fabrics.

## Personals

### Son To Martin Biers; Father Is With Templon

A son, Joseph Smith Bier, was born October 29 at St. Joseph Hospital, Far Rockaway, L. I., to Mr. and Mrs. Martin Bier. It is their second child.

Mr. Bier is assistant sales manager at Templon Spinning Mills, Inc. The infant's grandfather is Mac Bier.

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*Swimwear*

# Schiffli Embroidery Stretches With Fabric In Darlene Full-Fashioned Line

By ILANA HIRSCH

Darlene Swimwear begins the 1962 season with a basic collection of full-fashioned sheaths and maillots and uses these as a point of departure for new styles, fabric treatments, color and design. All suits knitted by Darlene are contour shaped in the knitting process with no darts, tucks or seams with the exception of side seams necessary to join front and back panels. Because all fabrics stretch in all directions with equal ease and straps adjust to the wearer's requirements, the suits fit women of various heights.

Several colors are emphasized and white is an important ingredient in prints and stripes. Some highlighted shades are Persian pink, Rio red, blue, chartreuse, green and black.

The application of Schiffli embroidery to Darlene's full-fashioned suits does not hamper the stretchability of the fabric. Quite the contrary — the embroidery stretches with the suit with no distortion or breakage.

An allover tapestry effect is created with multi-color Schiffli embroidery on a black Dartex (Ban-Lon, nylon and rubber) sheath. The design, in red, pink, orange, lime and yellow, approaches a floral pattern. Embroidery also comes in solid color and in other designs.

Another Darlene highlight, and new for '62, uses Schiffli embroidery on nylon tricot which is placed over a Dartex shell. As a result the tricot is puckered with a dimensional appearance. On one suit, pink embrodiery in a floral design is used on white tricot and a white Dartex shell and black is used on red. An intarsia on the straps duplicate in color and design the floral pattern of the suit.

Prints are large and clean and usually in one color on a white ground. Because of full-fashioning, they are unbroken across the entire front and back of a suit.

Printed on Darnille, an elasticized looped nylon, is a sunburst design with center of interest on the left hip and rays of the design extending to all portions of the suit.

Flowers in one or two colors are a popular print theme. For color interest, purple and blue daisies are scattered abstractly on a white ground and large carnations in green or purple are placed also on a white ground. Two-tone butterflies are another new Darlene motif on white. The repetition of this theme stresses the clean, distinct look where color and form are equally important.

Open designs, also formed in the knitting process, are shown by Darlene. Three rows of oval cutouts create a cummerbund effect on a sheath, and a single row of oval cutout portions extends from neckline to straps and around to the backline of another suit.

An angora suit, and adaptation of last year's successful model, has unusual cutout back creating a two-piece look. The open portion extends to the sides where a narrow, front tie begins. This tie creates soft gathers and a slight blouson look. The angora suit has a scoop neck and back.

Another adaptation is a two-piece checkerboard suit. A typical lively combination of colors is orange with black. Trunks are subdivided into four sections and the bra — down to its center button detail — is half orange and half black.

A wide lacy band that forms neck, back and straps, is another successful detail that is repeated for 1962.

### Intarsias

Intarsias continue in popularity. Necklines, backlines and panels have these knitted-in floral and geometric designs. A rose intarsia extends along neck and backline. A black sheath has waist tapered center panel in white where flowers in contrasting color run alongside the color periphery.

Darlene's most unusual trim—two parallel rows of fabric across the V-neck and back in a lattice effect—is on a Darnille suit.

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*Swimwear*

# Knits In Maidenform Line Are Draped And Shirred For Flattering Softness

Maidenform Swimwear is celebrating its first anniversary with a collection of swim suits more numerous and more varied than its premier line. The silhouette and fabric range is greater with emphasis divided equally between sheaths and maillots; knits and woven numbers. Receiving increased attention for summer 1962 are boy leg styles and two piece suits.

"Color is kaleidoscope" at Maidenform as hot bright shades are featured alongside pastels. Black and white are also important in checks, prints and embroidered suits. Some highlighted shades are apple red, orange, chartreuse, blue, fuchsia, turquoise and royal.

Many of these shades come together in a vibrant, block overprint 100 per cent Helanca knit maillot offered in one- and two-piece styles the latter of which has adjustable trunks.

Two colors combine on many suits including two stretch nylon and rubber knit maillots. One has bold diagonal stripes mitred on a button detailed center panel where black combines with magenta, green or turquoise, and the other is a solid color with a sash — made to be worn in a number of ways — in a boldly contrasting shade.

Two colors meet on another elasticized nylon knit maillot in color spaced blocks set against a solid color ground and on a two-piece maillot with an irregular, wraparound design in contrasting color. On a one-piece cotton knit shades of blue, magenta or green combine in a linear print. This V-neck maillot has a front dickey inset.

Three woven elasticized suits tell a story in black and white. A classic sheath woven in a faille construction has a solid white scoop neck and square back top edged in black and black and white checked trunks. A black Rorschach-type inkblot design is printed on a white ground in a faille sheath with a band and bow trim at the bustline. A tunic skirt over boy leg trunks creates an apron effect on a demure little suit in black and white gingham checks.

**Draped And Shirred Knits**

Knits take on a dressy appearance with artful draping and shirring and gay screen prints. Flat, colorful florals predominate and include, in elasticized cotton, art nouveau flowers on a scoop neck and back sheath and tulips on a V-front and back maillot. Poppies cover a classic sheath made of an imported Italian double - woven stretch fabric and ombre daisies design another sheath made of 100 per cent Helanca knit. The former has soft gathers at the bust and narrow black straps channelled through the back binding and tied at the tip of the plunge. The latter has a surplice draped front and plunging back.

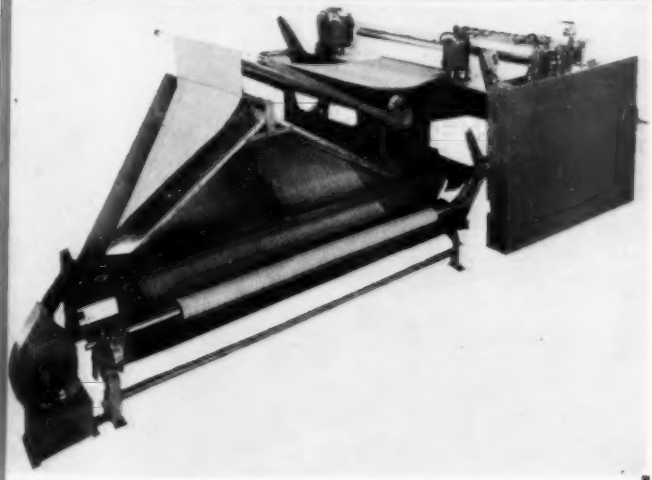
Large red roses on a black ground appear on a suit in the identical silhouette. This silhouette being so graceful and a new shape for knits is used for a number of suits in both solids and prints.

Textured knits are not omitted from the line. These include a maillot knitted of elasticized cotton in a two-tone sculptured jacquard. A black band frames the suit at neckline and hem and also is used as a waistline tie. A maillot knitted of elasticized acrylic knit has a gray and white diagonally striped top and a gray heather trunks. A vivid red stripe bisects these areas.

In its line, Maidenform incorporates several classic sheaths and maillots, but stresses artful draping and femining shirring to suggest a softer, more flattering suit for the average figure.

An asymmetrical drape that begins below the waistline and extends to a pleated bustline adds softness to strapless sheaths in elasticized satin and faille weaves. One of the most elegant suits is made of Vyrene and silk shantung, has a diagonally draped front and is designed in a muted oriental motif. A sarong drape appears on a multi-color floral printed suit which also has draped bra, and the tailored lines of a boy leg printed in a brushed floral print are softened by a draped top. Having both a softly pleated bustline and a low V-

(*Continued on Page* 87)

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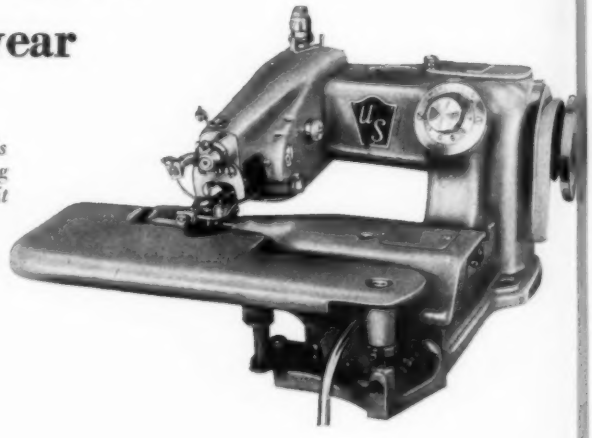

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draped backline is a classic sheath made of woven elasticized Vyrene that weighs 6½ ounces. It is printed in a vibrant, abstract floral.

Draping and shirring effects are used on a two-piece maillot woven in gingham checks. Other two-piece suits, all cotton knits, are a maillot with draw string adjustable bra and trunks and a boy leg patterned in a multicolor linear print.

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Offered in black, white or blue is a classic sheath with a most unusual trim: multi-color ribbons reaching across and diagonally down the front in a spray effect. Sueded Lastex is used as a trim to frame the sides of a maillot printed in an abstract "primitif" design. The side framing effect is used by Maidenform on other suits as well.

The most delicate of all trimmings used by Maidenform is on a tapered boy leg elasticized faille suit. It has allover confetti embroidery and Danish embroidered ribbon straps and belt.

## *Equipment Firms*

### Scott & Williams Appoints Sales Vice President

LACONIA, N. H. — William O. McMillan has been appointed vice president in charge of sales for Scott & Williams, Inc., knitting machinery manufacturers. Mr. McMillan succeeds Beale J. Faucette who has been designated a full time sales consultant.

Mr. McMillan, who was for many years a member of the sales division, more recently headed up the company's research and engineering work.

The research and engineering responsibilities will be directed by Stanley R. Shelmire and John Ross, assistant vice presidents.

### Eric B. Norman Named By H. W. Butterworth

BETHAYRES, Pa.—Eric B. Norman has been appointed general sales manager of H. W. Butterworth & Sons Co., manufacturer of textile finishing machinery, synthetic fiber processing machinery, and calender rolls for the paper industry. Butterworth is a division of Van Norman Industries, Inc.


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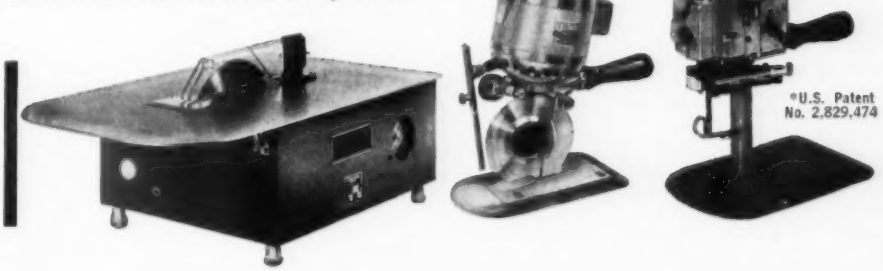

*U.S. Patent No. 2,829,474

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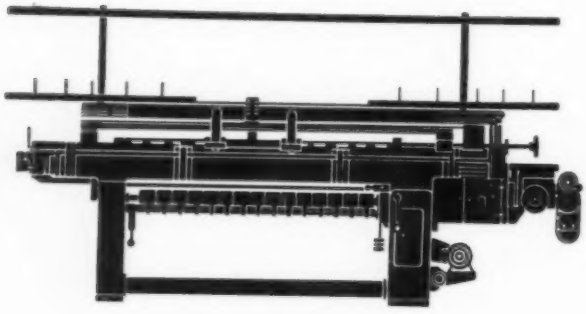

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*Infants' & Children's*

# Successful Holiday Market Staged By Western Children's Brand Wagon

By PEG HOPPIN MOOR

SAN FRANCISCO, Calif.—A highly successful holiday market week was staged here by the Western Children's Brand Wagon, Inc., at the Whitcomb Hotel September 16-19. Knits were in particular demand with holiday sweaters of all kinds being endorsed by buyers. For girls, hooded sweaters in every size from the sacque set to preteens, and knit tops mated with corduroy pants were recurring themes. Babies' legging sets were also important.

As secretary of the association, Michael McMurray indicated that from all reports the market was much more active than the comparable one of a year ago. In speaking of his own line from Wonderknit, he had some enthusiastic remarks to make about the sale of knits. Interest in boys' knitwear is very great, he stated, mentioning the fact that mothers love knit shirts because of their no ironing feature.

Discussing trends, Mr. McMurray noted that brighter shades with a crisp clean look — "nothing goopy" — were popular. In boys' knit shirts, the variety of collar stylings, fashion treatments at the bottom, and sleeves of all kinds are important details. He also cited the swing toward quality and the use of brand name fabrics which he feels is important to retail stores combating the discount houses.

At I. Jablow and Co., Inc., Harold Bovill reported that boys' collared knit shirts were outstanding. Acrilan, he indicated, was very good in solid hot shades.

Slipons, high button cardigans, and zipper sweaters were important at Pauker Boyswear Corp. with Max Stern the representative. A zipper front, solid colored style with contrast trim down the shoulder was a leader

(*Continued on Page* 90)


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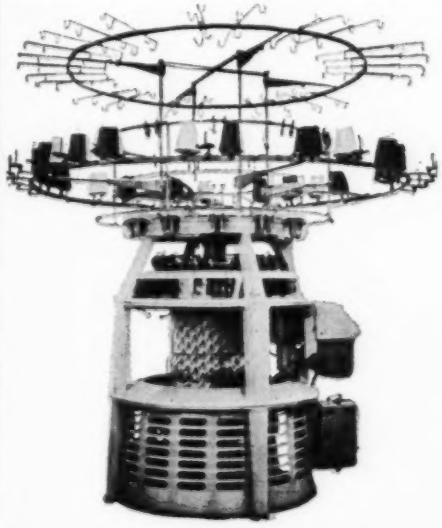

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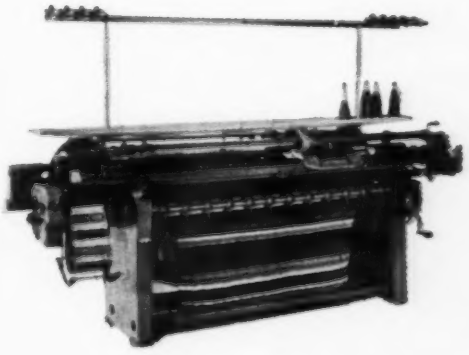

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at $7.98-$8.98 retail. It is made of lamb's wool and Orlon.

"Better than last year," was the description of market sales given by Jack Gearon of Playmore Knits, Inc. In sweaters, Mr. Gearon reported that bulkies are still popular as are Shetlands.

At Regal Knitwear Co., bulky sweaters were also selling well in new colors such as blue ice, candy green, peach sherbet, and lemonade. High style, fringe trimmed designs were being endorsed for sub teens.

Poncho bottoms on girls' cotton knit shirts were very popular at Savoy Knitting Mills where Schaefer and Rymer were the representatives. A leading style in this group has an exaggerated Peter Pan collar, set-in sleeves, and a placket neck opening. At $2.98 retail, sizes 7-14, the best colors are green, blue, aqua, and red.

Mr. Schaefer explained that the firm introduced just one style with a poncho bottom in the fall and this was so successful that the number of offerings had been greatly enlarged in the holiday line.

Interlined Capri pants were also moving well, Mr. Schaefer noted, in sizes 3-6x and 7-14. Knits, he reported, are the most popular in solid colors whereas woven fabrics are preferred in "crazy pants."

Hooded girls' sweaters of Orlon were being endorsed at Janie Originals, Inc., according to Dick Pearson.

Novelty knits in bulkies and flat knit blouse-sweaters, grandiose collars and rolled necklines were some of the trends noted by Mr. Pearson. A popular sub-teen sweater with him had a huge collar that rolled into a hood.

In colors, Mr. Pearson indicated that in the 7-14 and sub teen range, black was the ten to one favorite over white, white was preferred over the next leading color, red, by the same ratio (10-1). In 3-6x, a lighter shade of red, and white led in color interest.

From his Holiday Togs line, Mr. Pearson stated that girls' wear buyers were definitely favoring knit tops to be worn with corduroy pants.

(*Continued on Next Page*)

Marty Bogash, representing the sub-teen Darlenette line by Darlene Knitwear, said that for him the market was much more active than that of a year ago. Buyers, he stated, were interested in angora sweaters for holiday selling with aqua, pink, orange, and mint popular colors.

Bulkies also came in for attention.

Leading sellers at Darlenette included a tie collared slipover of French angora and wool made to retail at $14.98, sizes 8-16, pre-teen. Favored colors are beautiful shades of aqua and pink. A hooded bulky cardigan in a shaker stitch was also finding favor at $13.98 retail.

Color was an important factor in the sales of boucle knit baby items according to Nestor Palladius of Youthcraft Knitting Co. Copen blue, he indicated, is taking the place of baby blue in both infants' and toddlers' items. Plain white continues to be good while gold, particularly in the toddler range, is in demand.

A leading style with Mr. Palladius was a two-piece suit with plastic lined pants and a jacket styled similar to a collarless cardigan with a modified cutaway front. Legging sets, Mr. Palladius stated, are coming back strongly and seem to be replacing snow suits.

Sweaters in Tow Hue dyed high bulk Orlon were also being endorsed, according to Mr. Palladius. Toddler sizes were the most popular with red, copen blue, willow green, and gold the leading shades.

Among the Youthcraft sweaters, hooded styles for girls were popular. A leading number in this group used willow green or red, both with white trim, in a cardigan made to retail at $4.98, 2-4, and $6.98 in 4-6X. It was selling best for toddlers.

Important in San Francisco, Mr. Palladius noted, was a boys' cardigan in a heavy Orlon knit with a fleece back. A four button style with a convertible collar, it retails at $3.98 in toddler sizes, $4.98 in 4-6X.

In sweater colors, gold and willow green were leading in boys' wear, and magenta and orchid in girls, Mr. Palladius said.

Hooded sacque sets of Orlon were important at Frieman Knitwear.


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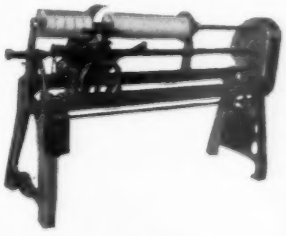

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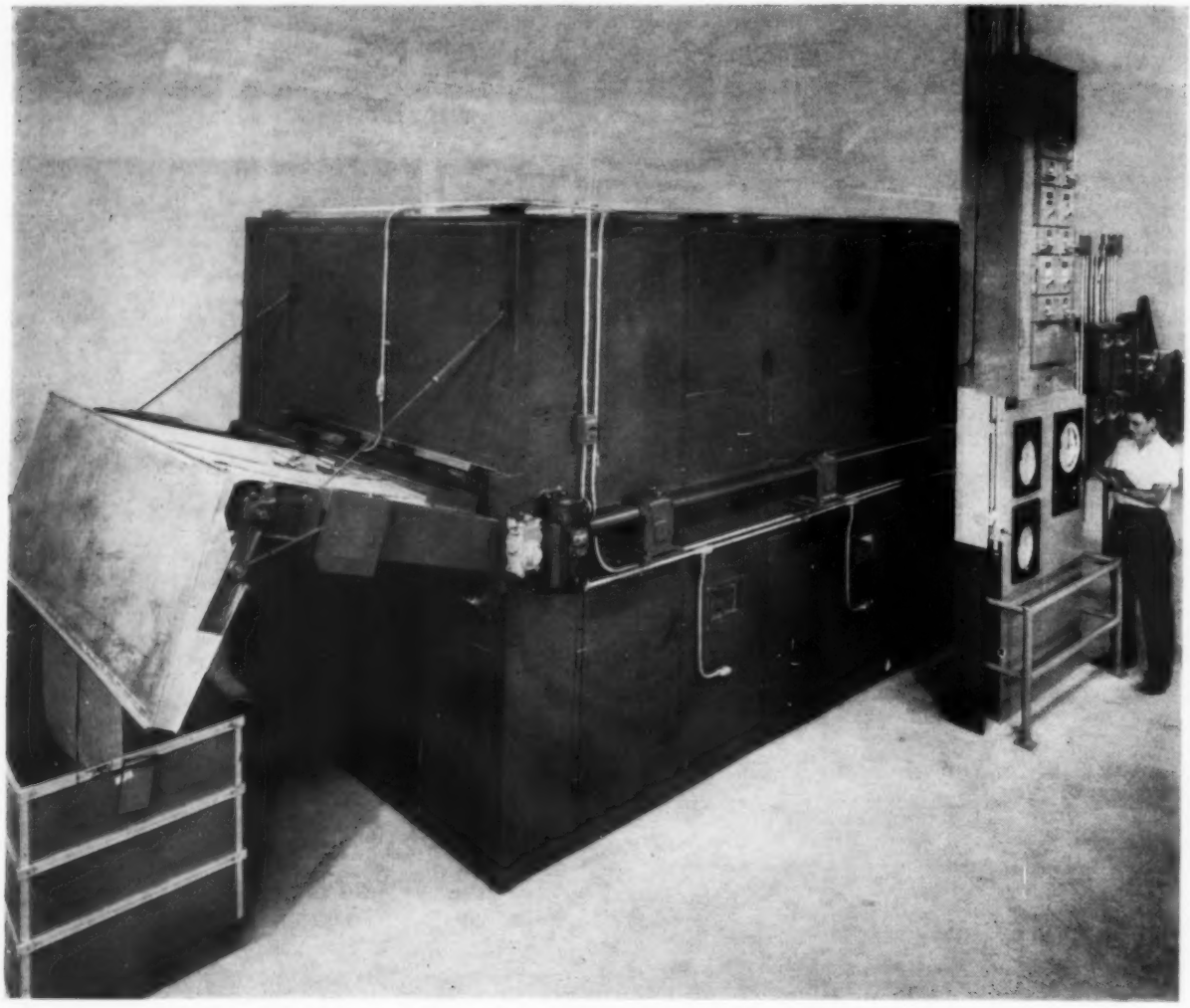


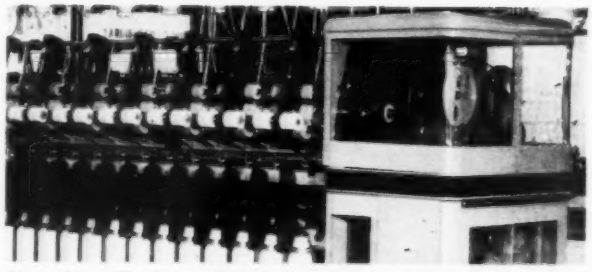
# Tension-free drying for knitted goods

## with the Saco-Lowell/Fleissner System

Now you can have completely relaxed, tension-free drying that produces higher quality knitted goods at lower cost. Available for either gas or steam operation, the Saco-Lowell/Fleissner Dryer utilizes reverse action drying. It is the only dryer that is self-threading. Its perforated suction drums hold fabric or raw stock in place gently yet firmly, while this same air suction dries it.

But excellent performance is only part of the story. Controlled tests show the Saco-Lowell/Fleissner Drying System requires only 1.5 pounds of steam to evaporate 1 pound of moisture. Rate of evaporation is also impressive: 3 times more water per square foot of drying surface than any other system!

Your first inspection of the Saco-Lowell/Fleissner Drying System will convince you that, like all Saco-Lowell textile machines, **it's built for better performance, backed by better service.**



Saco-Lowell's Long Staple Spinning System is designed for worsteds, synthetics and blends with 1.5" to 9" staple. It permits 50% higher drafts... cuts lubricating and cleaning time as much as 60%.

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## Knit Yardgoods

### Kodel Double Knit Offered By Milliken

Development of what is claimed to be the first double knit fabric embodying a polyester fiber was announced by the knit division of Milliken Woolens, Inc. The fabric is a 60/40 blend of Kodel and wool. Kodel is Eastman Chemical Products' polyester fiber.

The new fabric will be introduced for the spring '62 season. Available in gray, white, red, black, light blue, bright blue, navy blue, beige, cafe au lait and tan, the fabric knitted in double pique stitch is 60 inches wide and weight is 13½-14 ounces per linear yard.

"Because of Kodel, we have been able to develop a double knit that can be tossed into a washer-dryer and will emerge smooth, spotless and ready to wear." John Chambers, sales manager, Milliken knit division, said. "Kodel also makes it possible to achieve a knit fabric that pleats permanently, has a rich, full hand, excellent stitch definition and shape retention. Garments retain their neat appearance and show no signs of sagging, stretching or wrinkling. In addition, the resilience of Kodel (wet or dry) makes possible a lightweight fabric with body that is practical for almost all year 'round wear."

### Laurence Sommer Heads Dan River Knit Cloth Unit

Appointment of Laurence Sommer as department merchandise manager for Dan River Mills, new knit fabrics department was announced last week.

Mr. Sommer comes to Dan River after three years with Security Mills in a selling capacity. Prior to that he was sales manager for Fair-Tex Mills, knit fabric mill.

### Double Knit Dress Firm Opens N. Y. Showroom

Bravo Fashions, Inc., with offices in Modena and Pesaro, Italy, has just opened a new showroom at 1407 Broadway, New York City. Bernard Ruderman, sales manager, will be in charge.

The company's new line, imports from Belgium and Italy,

LAURENCE SOMMER

will feature one- two- and 3-piece suits and dresses for women and sweaters for both sexes. The line includes wools, cottons and synthetic knits; some items are trimmed with leather.

The wholesale price range of Bravo Fashions is $6.75 to $12.95 for dresses; suits from $14.75 to $29.95. Sweaters, Italian-made ladies bulkies and mohairs, start at $6.75.

### A. Kraushar Named Rich-Flex Sales Agent

Abraham Kraushar, formerly with Puritan Dress Co., has been appointed New York City sales representative for Rich-Flex Mfg. Corporation, makers of elastic yarns.

## Trimmings

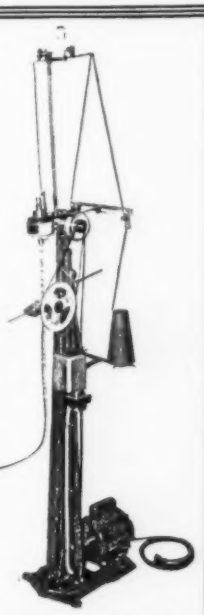
### New Adhesive Eliminates Sewing Of Medallions

An adhesive to join textiles, introduced by American Fabrics Co., 29 West 36th Street is said to eliminate sewing of trimmings, medallions, labels and other items used to decorate or identify garments. Why-Sew? is a fast-drying, flexible adhesive.

To demonstrate its holding strength, a model wore a sheath cocktail dress cut from Springmaid fabrics and Mandelace and with "glued" zipper, darts and seams had no difficulty turning and bending.

"The adhesive has already been tested repeatedly for machine washability and resistance to dry-cleaning solvents, and shows no deterioration," said a company spokesman. Plans call for immediate test marketing and regional distribution by January 1962, in time for the spring trimming sales peak.

THE AINSLIE String MACHINE



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# Knit Constructions of the Hour on Timetable Schedules

## Bentley-Wildt Mellor Bromley Line

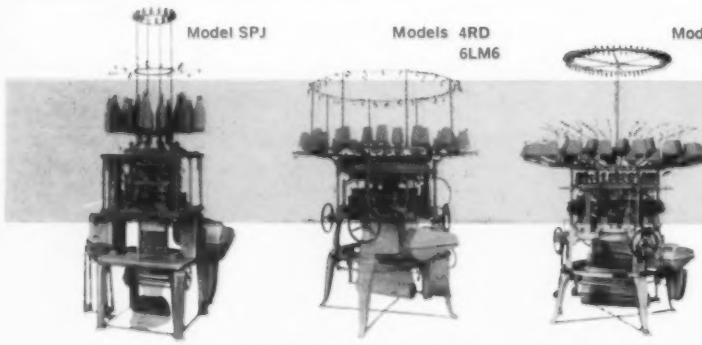
| CONSTRUCTION SCHEDULE | FEED | DIA. | N.P.I. | MODEL |
|---|---|---|---|---|
| Double Knit Jersey Fab. Lengths | 44 | 30″ | 16 & 18 | † • 6LM6* |
| Single Piqué Fab. Lengths | 44 | 30″ | 16 & 18 | † • 6LM6* |
| Single Piqué Fab. Lengths | 32 | 30″ | 16 & 18 | † • 4RD* |
| Double Piqué Fab. Lengths | 44 | 30″ | 16 & 18 | † • 6LM6* |
| Double Piqué Fab. Lengths | 24 | 30″ | 14 to 18 | † • 5RGS2* |
| Double Piqué Fab. Lengths | 32 | 30″ | 16 & 18 | † • 4RD* |
| Eight Lock Fab. Lengths | 44 | 30″ | 16 to 18 | † • 6LM6* |
| Eight Lock Fab. Lengths | 24 | 30″ | 14 to 18 | † • 5RGS2* |
| Eight Lock Fab. Lengths | 32 | 30″ | 16 & 18 | † • 4RD* |
| Horizontal Stripes Fab. Lengths | 44 | 30″ | 16 & 18 | † • 6LM6* |
| Horizontal Stripes Fab. Lengths | 24 | 30″ | 14 to 18 | † • 5RGS2* |
| Horizontal Stripes Fab. Lengths | 32 | 30″ | 16 & 18 | † • 4RD* |
| Horizontal Stripes Garment Lengths | 4 to 6 | 16″—18″—22″ | 5 to 14 | † • SPJ |
| Jacquard Double Knit Fab. Lengths | 24 | 30″ | 14 to 18 | † • 5RGS2* |
| Bourrelet Fab. Lengths | 24 | 30″ | 14 to 18 | † • 5RGS2* |
| Bourrelet Fab. Lengths | 32 | 30″ | 16 & 18 | † • 4RD* |
| Interlock Fab. Lengths | 24 | 30″ | 14 to 18 | † • 5RGS2* |
| Ripple Stitch Fab. Lengths | 24 | 30″ | 14 to 18 | † • 5RGS2* |
| Blister Stitch Fab. Lengths | 24 | 30″ | 14 to 18 | † • 5RGS2* |
| Jacquard Purl Garment Lengths | 4 to 6 | 16″—18″—22″ | 5 to 14 | † • SPJ |
| Links-Links Garment Lengths | 4 to 6 | 16″—18″—22″ | 5 to 14 | † • SPJ |

*Note — These models have been running double knit constructions for years with time-table efficiency — are long past experimental stages.
• Note — All models will run fine count wools, cottons, blends and synthetics.

Model SPJ

Models 4RD 6LM6

Model 5RGS2



†Send for brochures which detail how you can knit these constructions with time-table efficiency.

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## Says Manufacturer Can Cut Shrinkage

CHICAGO, Ill. — By the use of proper finishing procedures and the choice of fabric structures, wool fabrics can now be produced which successfully minimize the shrinkage which occur during laundering, an Australian scientist told a laundry manufacturers meeting October 26.

Dr. John R. McPhee, senior research officer, division of textile industry, of the Commonwealth Scientific and Industrial Research Organization in Geelong, spoke at the 15th National Home Laundry Conference, on "Machine Laundering of Untreated and Treated All-Wool Fabrics." He is on loan to the Wool Bureau in Lowell, Mass., from the CSIRO to assist in the further research and development of scientific techniques designed to increase the easy-care performance characteristics of wool at the Bureau's experimental finishing plant recently established at the Lowell Technological Institute.

Three different types of shrinkage occur in untreated wool fabrics, Dr. McPhee said. "Relaxation shrinkage," when the wool fabric is wet, is due to the release of strains imparted to yarns during manufacture; "felting shrinkage" results from fiber movements when wool is agitated in water; and "tumble-drying relaxation" occurs when wet wool fabrics are tumble-dryed, but then reversed when the fabrics are re-wet and air-dryed.

High-washing temperatures and hig tumble-drying temperatures play a minor role in the felting shrinkage exhbiited by wool fabrics, he maintained, for the important factor to be considered is that the force applied during washing be as low as possible. Any wool fabric properly treated for resistance to felting shrinkage, and many untreated ones, can best be laundered by using gentle, slow-speed cycles on agitator machines.

However, Dr. McPhee concluded, a great many tight plain or double knit wool fabrics can now be chemically treated to be completely "machine washable in the broadest meaning of the term." Today, wool blankets and knitted outerwear are available which can be machine washed and tumble-dryed. Further development work is now in process, he reported, to apply the methods of machine-washability and machine-dryability to the fields of slack, shirts, blouses and children's wear made from both woolen and worsted fabrics.

## U.S. Wool Executives To Meet Secretariat

A reception and dinner for leading executives of U. S. wool textile manufacturing industry and the top executives of the International Wool Secretariat will be held November 9 at the Sheraton-East Hotel in New York City, the Wool Bureau has announced.

It will be the first time that the North American division of the I.W.S. will bring together U. S. textile leaders and the executives of the Secretariat's world-wide wool promotion and research organization. Mr. Edwin Wilkinson, president of the National Association of Wool Manufacturers, will introduce the I.W.S. executives to the U. S. industry leaders.

Also invited are representatives of other wool promotion organizations, including the American Wool Council, Woolens & Worsteds of America, and Woolknit Associates, and such wool textile associations as the Boston, Philadelphia and New York Wool Trades, and the National Association of Wool Manufacturers.

Representing the I.W.S. will be: Sir William Gunn, Australia, chairman of the board; Mr. Jack Acland, New Zealand, vice chairman; Dr. J. G. van der Wath, South Africa, vice chairman; and Mr. William J. Vines, London, newly-appointed world managing director. Mr. Vines assumes his post on October 31, and will direct operations of the organization's three regions, North America, Europe and Asia.

It is expected that Sir William and his colleagues will make some important policy announcements on I.W.S. programs in the U. S.


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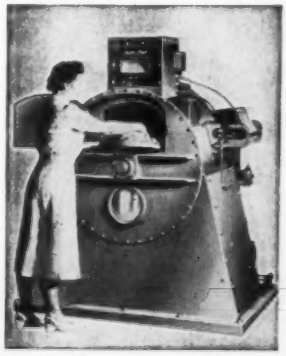

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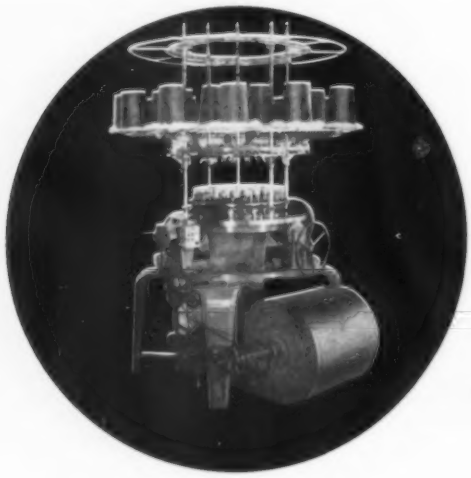

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## Financial

# Earnings Up 10% At Bobbie Brooks

CLEVELAND, O.—Bobbie Brooks, Inc., manufacturer of young women's apparel, reported a 10 per cent increase in first quarter earnings and a 14 per cent increase in sales over last year.

The net profit for the three months ended July 31 increased to $644,200, or 48 cents per common share, over last year's 43 cents.

Sales rose from $11,173,000 to $12,697,100. The figures included the sales and profits of Abby Michael, Ltd., the subsidiary acquired April 30. If the Abby Michael sales were included only from the date of aquisition, the Brooks figures would be considerably higher.

**Sees New Record**

Maurice Saltzman, president of Bobbie Brooks, predicted new records this year. The line thus far has received unprecedented response and this will show up in the next quarter's figures, he said.

The company's new distribution center here is saving 20 per cent on shipping costs. A major expansion of Abby Michael is underway.

The spring line has been introduced. As an example of the expected boom in business, Mr. Saltzman cited the revision of the original estimates on intarsia coordinates. By September 18, a month or more in advantage of the season's close for this line, it was sold out.

# Munsingwear Sales Higher Than In 1960

MINNEAPOLIS, Minn. — Third quarter sales of Munsingwear, Inc., here were slightly higher than a year ago while profits were about the same, according to a quarterly report to stockholders.

Third quarter sales totaled $13,614,000, compared with $13,265,000 last year. Net income of about $411,000 was equal to 51 cents per share of common stock, the same per share figure as last year.

For the first nine months of 1961, sales totaled $34,740,415, compared with $33,814,578 in the comparable period of 1960. Net income in 1961 totaled $927,703, or $1.14 per share, compared with $1,125,680 or $1.40 a year ago.

# Common Stock Dividends Declared By White Stag

PORTLAND, Ore. — White Stag Manufacturing Company has declared a regular quarterly dividend of 25 cents per share on all Class A common stock, and seven and one-half cents per share on classes B-3 through B-5 common stock, payable November 15 to stockholders of record November 1.

The company also has declared a dividend of $1.12½ per share on preferred stock, payable December 1 to stockholders of record November 17.

## Factoring

# '61 Factoring Seen Hitting $16 Billion

A $16 billion volume for 1961 was cited as a growth index of the commercial finance and factoring industry by J. Martin Seiler, president of the National Commercial Finance Conference, Inc.

Speaking at the opening session of the organization's 17th annual convention, Mr. Seiler said, "Commercial finance alone is expected to do $11 billion of business this year and factoring an additional five billion."

Convened at the Waldorf-Astoria, 725 delegates representing the 113 member firms of the National Commercial Finance Conference, Inc., discussed methods, procedures and techniques of their industry.

Jerome Harber, senior vice president of Mill Factors Corporation, was elected a director and member of the executive committee of the conference.

He has been associated with the commercial finance and factoring field since 1939 when he joined Mill Factors.

# England To Head Talcott New Business Unit

Robert J. England, a vice president of James Talcott, Inc., will direct new business development for the company's factoring division.

Mr. England, elected vice president in 1954, has been in factoring since joining Talcott in 1933.


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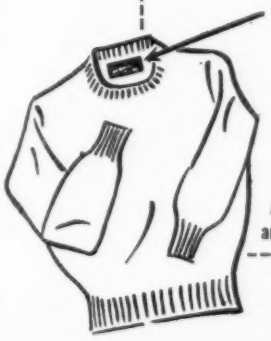
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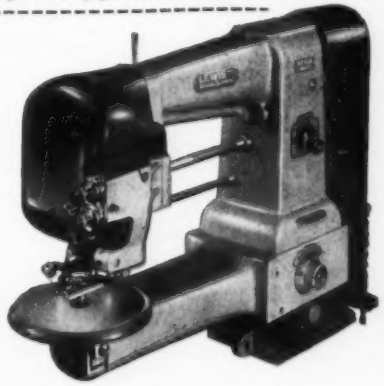
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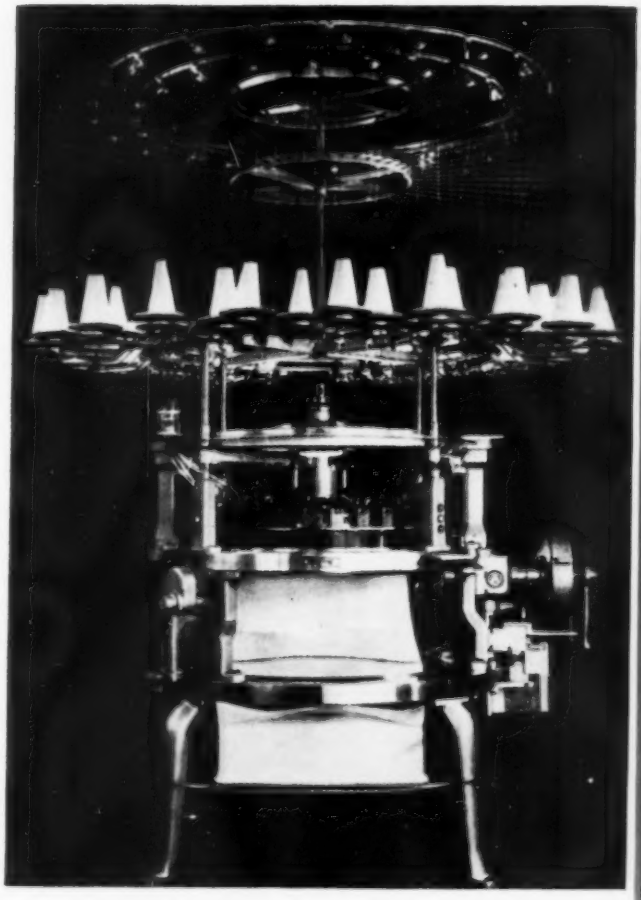

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*Exports*

# Cuddle Knit Has Export Windfall In Latin America

Four years ago, Harry Bochner, an amiable trader who operates out of a tiny showroom in a midtown hotel, introduced Cuddle Knit International, Inc., manufacturers of women's Ban-Lon coordinates, to the Latin American export market. It was a good match; today the firm is doing big business.

Its garments, solid color cardigan and slipover sets — *conjuntos*—will outsell a competitor that is ten per cent cheaper, Mr. Bochner said. Ninety per cent of the firm's business is export. The phone in Mr. Bochner's office rings all day with calls from Brazil, and exporters beat a steady path to his door at 45 West 35th Street. (Cuddle Knit does not export; it sells to agents.) Orders are booked to the end of the year.

Cuddle Knit has factories in Queens Village and Lindenhurst, L. I. Its garments are neatly turned out and sell for $6.95 to $7.95 domestically, a little more in Latin America. They come in white, baby blue, hot pink, porcelain blue, light pink, jockey red, maize, beige, orange blossom, honey, lilac, mint, black and ivy green.

The style is classic, and the firm intends to stick to it. Why not?

According to Mr. Bochner, the firm is aware that the industrialization of Latin American countries will terminate much of its business. But Mr. Bochner estimates that the changeover is two or three years away. For one thing, the Ban-Lon output is parcelled out in quotas by Joseph Bancroft & Sons, the manufacturer. For another, a new line needs skilled workers, and it will take time to develop them. Finally, a big hump to cross is dyeing, a complex process that is still not as well understood down there as up here.

Meanwhile, the firm is sailing merrily along, having opened a small office in Sao Paolo, Brazil.

Mr. Bochner's door is open to all exporters. He evaluates the credentials of buyers with his Dun & Bradstreet manual, and from then on, its just business, business and more business.

## Employment Agency For Apparel Trade Formed

An employment agency for the apparel industry has been established in the garment center by two industrial engineers both veterans of the knitwear trade.

James Saunders, former executive at Ciro Sportswear, and his partner, Frank S. Halpin, former vice president of Barclay Knitwear in charge of plant operation, have set up shop at 469 Seventh Avenue as Apparel Personnel Associates, Inc.

In two months of operations, the firm has filled a number of executive and junior executive positions with leading manufacturers. Mr. Saunders and Mr. Halpin carefully screen and check all applicants. They employ a series of checklists, forms which are offered, incidentally without charge to the industry. Psychological tests are administered if required by the prospective employer.

A major portion of their business is in executive searches.

Mr. Saunders was with Ciro 21 years. He also was with Ann Adams Knitwear and with Sportempos as a merchandiser.


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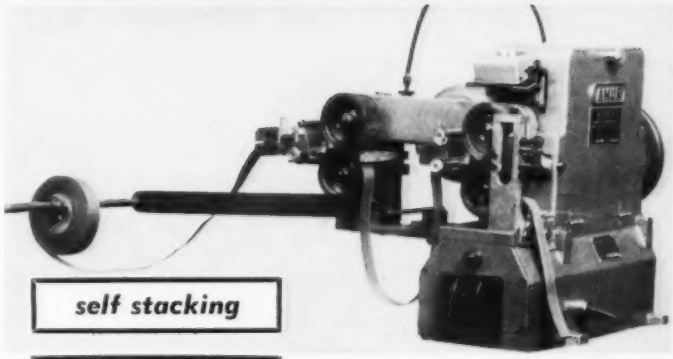

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| 12-20 in. | 3,600 |
| 20-44 in. | 1,800 |

MONTROSE SUPPLY & EQUIPMENT CO.
div. of Montrose Oil & Belting Co., Inc.
71 N. 6th St., Brooklyn 11, N. Y. STagg 2-7929

OPERATION TRADE-IN . . .

High Allowances Toward New Machines Now Being Given!!

Use LAMB Equipment to:

- Increase Production
- Reduce "Down" Time
- Lower Costs
- Improve Quality of Trim

Lamb SINCE 1867

KNITTING MACHINE CORPORATION
8 Montgomery Street, Chicopee Falls, Mass.
Brooklyn & Metropolitan Area Representative: JOHN HEITMAN
302 Bedford Ave., Brooklyn, N. Y.

***Dyes & Chemicals***

## New Dyeing Aid For Wool And Nylon

Superb wetting qualities and excellent dye penetration, even where shrinkage occurs, are claimed for Lanamol CW, a new dyeing aid for use on wool and nylon fabrics and yarns.

Lanamol CW, produced by Allied Chemical's National Aniline Division, provides additional advantages such as full and level dyeing, complete dye exhaustion and a freezing point of —15° C., which affords protection during winter transit and storage.

Lanamol CW is a clear viscous liquid with acidity at pH 4.0. Solubility in water is good in all proportions and surface tension of 0.07 per cent aqueous solution is 42 dynes/cm.

The new dyeing aid is said to be particularly effective when used in conjunction with National Aniline's neutral dyeing, pre-metallized Lanamid dyes, but it may be employed with other National Milling dyes and certain other acid dyes.

For dyeing wool, Lanamol CW is used with ammonium sulfate in a neutral or weak acidic, pH 4.6, bath. The scoured material is wet out completely in a bath containing one per cent Lanamol CW. Bath temperature must be below 100° F. One to three per cent ammonium sulfate or acetate is added to the bath and the pH is allowed to come to equilibrium.

The dye is next mixed with an equal amount of cold water to make a paste, which is dissolved by adding hot to boiling water and stirring. This solution is strained into the bath that contains the fabric.

The temperature of the dyebath is slowly raised to the boil for three-quarters to one hour. If complete exhaustion is required, one-half to one per cent of 28 per cent acetic acid may be added and boiling may be extended for another 15 minutes.

Lanamol CW can also be used for dyeing nylon 6 and nylon 66 in a neutral or weak acidic bath. Here, the scoured material is wet out for 5 minutes at 70° F. The dye is dissolved and added in the same manner as for wool and is run cold for 10 minutes. One to three per cent of Lanamol CW and 10 per cent ammonium sulfate are added and the bath is allowed to run cold for one-half hour. Bath temperature is then slowly raised to the boil over a period of three-quarters to one hour. If necessary, it can be exhausted with a 2-4 per cent of 28 per cent acetic acid.

## New Brown Reactive Dye Introduced By Ciba Co.

A new pure yellowish brown shade, Cibacron Brown 4 GR, unique in the field of reactive dyes has been introduced by CIBA Company, Inc.

The new dye shows excellent solubility and light fastness. These properties and the fact that the print pastes containing Cibacron Brown 4 GR show very good stability, make this shade of particular interest to the print trade. In addition to printing, this metal free dye is suitable for all types of application, i.e. pad-steam, thermofix, exhaust and cold pad batch.


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FOR TOP PRICES ON MEN'S AND BOYS'
- SWEATERS
- SWIM TRUNKS
- POLO SHIRTS
- WALK SHORTS

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***Advertising rates:*** **$6.00 per column inch per insertion. Positions wanted: $5.00 per column inch per insertion. Minimum space—2 inches. Ads for Monday's paper must be in by preceding Wednesday, 2 P.M. Please enclose payment with your order.**

MILL EQUIPMENT, MACHINERY FOR SALE—WANTED

### WANTED

10 cut or 12 cut AJUM or equivalent for Jacquard trims.

**BERNHARD ALTMANN INTERNATIONAL CORPORATION**

**Post Office BOX 2446** **Phone WA 3-4526**
**San Antonio, Texas**

### FOR SALE

1—Brinton TR, 900 needles, 28", 24 feed, motor drive, pattern wheels, serial number 8700.

1—Jacquard TAI, 13½ cut, 12 feed, 30", serial number 5000.

2—Jacquard TR, 6 feed, 7 cut, 30", set on 3½ gauge bulky.

1—Brinton ROF, 24", 32 feed, 1200 needles. Complete with pattern wheels and motor drive.

**BOX 460A**

### MACHINERY FOR SALE

1—Philip, 15 cut, 30", 32 feed
1—Scott & Williams MFRC, 30", 14½ cut
1—Jacquard AI, 16½ cut, 32", 32 feed
1—Jacquard LHB, 4 cut
7—Jacquard TA, 5 & 12 cut
1—Jacquard LH, 30", 6 cut
1—Jacquard LH, 30", 7 cut
3—Jacquard LH, 30", 8 cut
3—Jacquard TJ, 28", 8 cut
2—Jacquard TA-12, 30", 10½ cut
1—Jacquard TA-12, 30", 11 cut
1—Supreme BRW, 30", 4 cut, 16 feed
1—Wildman PB-2, 21", 8 cut
5—Universal Supramat, 63", 4 cut
4—Queens Tandems, 5 cut
1—Queens, 12 cut, 60", V-bed machine
1—Morat, 16 cut
2—Universal 6 spindle backwinder
7—Lamb, Dubied, Grosser machines, 5-14 cut
5—Brinton revolving take-up, 24", 18 cut, 64 feed
5—Fouquet, 26" & 24", 20 cut, pique

**Write, Wire or Phone**

**SPEIZMAN**
**KNITTING MACHINERY CORPORATION**

**350 Fifth Ave., New York 1, N. Y.** **PE 6-0930-1**

## FOR SALE

1—24 gauge F.F. knitting machine, 12 section, 31", Reading frame. Can be seen in operation.

**BOX 463**

## WANTED TO BUY

1—32" OG model OTA, 13 or 14 cut machine. Also, 30" cylinder and dial, 13 or 14 cut, must have replaceable teeth.

**Call UL 9-2685 or write Box 464**

## MACHINERY WANTED

A good used Dubied
"CAL" 7 cut, 75"
True cable attachment not necessary.

**EMPLE KNITTING MILLS**
**P.O. BOX 341**
**Brewer, Maine**

## WANTED

Fine cut TJI, 14¼ and 14½ cut machines.

**BOX 467**

## BEST JK BUYS

*See the New Mestre Flat Machine*

**3—Phila. Jacq. TJI, 14¼ cut, 30", 12 feed**
**1—Brinton, PR 19, 28", 12 cut, 24 feed, wheels, motor**
**1—Scott & Williams MFRC, 18 cut, 32 feed, 32"**
**1—Scott & Williams Philip mach., 14½ cut, 32 fd., 30"**
**1—Supreme BRW, 4 cut, 30", 16 feed**
**4—Phila. Jacq. LH Machs., 6, 7 & 8 Cut, 30", 6 Feed**
2—Phila. Jacq. TJ, 16" 7 & 8 Cut, 4 Feed, 4 Col Strip
2—Phila. Jacq. TJ, 28", 7 & 8 cut, 4 Col. Strip
6—Phila. Jacquard TAI Machs., 10, 12, 13, 13½, 16½ Cut, 30", 12 Feed
4—Phila. Jacquard TA Machs., 9, 10, 11, 12, 13 Cut, 30", 12 Feed
1—Phila. Jacq. LA, 10 cut, 30", 12 feed
1—Philadelphia Jacquard MLW, 28", 11 Cut, 24 Feed, Wheels and Jacquards
1—OG, model OTA, 13½ cut, 30", 12 feed
**1—O.G. Multi-Feed Jersey, 1x1 Rib, 8 Cut, 36 Feed, 32"**
**3—Leighton Machs., 22", 26", 28", 10 Cut, 6 Feed**
2—Wildman PB2 Machs., 17", 18", 8 Cut
**3—Lamb Border Machs., Double Head, 5, 7 & 8 Cut**
**1—Queens, Model B, 10 cut, 60", high and low jacks**
**1—Queens model BJ, jacquard flat, 10 cut, 60"**
2—Stafford & Holt machs., 30", 32", 6 & 7 Cut, 6 & 12 Feed
1—Backwinder, 6 spindles
**1—Universal Rotoconer, 20 Spindles**
3—Steam tables, assorted sizes

*Joseph Kopelowitz, Inc.*

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BOUGHT - SOLD - APPRAISED

487 KNICKERBOCKER AVE.
BROOKLYN 37, N. Y.

## FOR SALE

4—High speed Scott & Williams interlock knitting machines. 2-30", 18 cut; 1-30", 18½ cut; 1-30", 20 cut.

**BOX 450H**

## FOR SALE

Brinton 6 cut automatic glove machines. Lamb machines and DeSotco loopers. Also desks and office chairs.

**BOX 460H**

## FOR SALE

1—33" Philip, 1452 needles, with special attachment for various stitching and panel work. New.
1—Stoll fully automatic, 12 gauge, 700 needles, Excellent condition.
1—Fairbanks platform scale. New.
1—300 lb. capacity compressor.

**BOX 465**

## FOR SALE — CASH OR TERMS

1—Supreme BRW, 4 cut, 372 N., 9 stripers.
**1—Pernick calender, 60"**
1—160-2, Lewis label tacker, with standard motor.
2—Jacquard TJI, 30", 12 & 13¼ cut, 12 feed, 4 color stripers.
1—Jacquard AI, 30", 32 feed, 13½ cut.
10—Jacquard body size TA, 10 cut, 4 color stripers, 12" to 18".
4—Jacquard LH, 30", 7 & 8 cut, 6 feed with stripers.
2—Jacquard card punching machines, 1-44; 1-70 lever.
1—Columbia dry cleaning machine, model G.
1—Stoll, 10-cut border machine.
1—Stein separating machine.
8—Jacquard TAI, 30", 6, 12½, 13, 13½, and 14 cut, 12 feed, 12 stripers on each.
1—Brinton, 18", 14-cut, 24 feed, 792 needles.
2—Universals, 63", 4-cut—over 21,000 (serial no.).
1—Wildman PB2, 19", 10 cut, with motor attached.
1—Dubied VD, 44", 10-cut, Hi-Low butt needles.
1—Kastrinsky calender, 54".
2—Jacquard 1-TA; 1-TAI, 30", 10-cut, 12 feed
1—Jacquard LA, 15", 8 cut, 372 needles.
1—S & H, 30", PA, 8 feed, 7 cut.
1—Con-Sew clipper, practically new, #20, size 00 #50 Model 88.

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**Consultant for Appraisals and Liquidations**

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**WANTED**

Philadelphia Jacquard LA 30", 7 gauge. State machine number, condition and price.

**BOX 450C**

**WANTED**

Interested in purchasing flat machines, 4 cut and 10 cut, either Universals or Stolls.

**BOX 450F**

**FOR SALE**

2-80 spindle Foster model 12 skein winding machines.

**BOX 460F**

## Complete Children's Knitted Outerwear Plant For Sale

**Located in N. J. — 20 minutes from Penn Station**

Fully equipped with modern cutting, sewing and pressing machinery. (Over 90 sewing machines.)

27,000 sq. foot, plant on one floor.

130 skilled employees.

Will sell as a going business—including trade name, New York showroom and national representation — or will sell separately.

**IMMEDIATE ACTION REQUIRED**

**BOX 460K**

HELP WANTED

**UNUSUAL OPPORTUNITY**

**for aggressive man to make a permanent career starting as**

**TEXTILE MACHINERY TECHNICIAN**

with progressive, medium-size machinery manufacturer. Extensive travel from N.Y.C. office in U.S. and Canada to trouble-shoot as well as supervise installations. Challenge and responsibility for right man. College graduate under 28 preferred, mechanical inclination essential. Four months mill training period. Unusual benefits. Confidential.

**BOX 450**

**KNITTER-MECHANIC WANTED**

Experienced on Supreme pattern wheel machines.

**CERTIFIED KNITTING MILLS**
**ULSTER 5-4909**

**PRODUCTION MANAGER WANTED**

Knitting mill in New York City, manufacturing ladies cut and sewn sweaters, has opening for man experienced in handling finishing operation. Year-round position. Reply giving details of experience.

**BOX 453**

**INSIDE PRODUCTION MAN WANTED**

who can assume responsibility for complete operation on cut and sewn knitting mill. This is a new opening in an old, well established mill employing 65 people and located in the metropolitan New York area. Prefer former mill owner or person with jobber contacts to assist or replace business executive.

**Telephone: Days, BOwling Green 9-7983**
**Evenings, DIckens 5-6966**

**KNITTING ROOM FOREMAN WANTED**

To manage the knitting department of a large sweater factory. You must be fully experienced with personnel, production scheduling, yarn handling and quality control. This is a permanent position with unlimited possibilities. Include complete resume of experience and earnings in reply.

**BOX 460D**

**KNITTERS AND KNITTER-MECHANICS WANTED**

**EXPERIENCED ON RASCHEL RUBBER**

For new plant in North Caldwell, N.J.
Will consider Raschel knitters.
Steady work, good opportunity.

**Call LE 2-7992 (N.Y.C.)**
**or write in strictest confidence to BOX 462**

**KNITTING FOREMAN-MECHANIC**
**WILDMAN P.B. 2 MACHINES**

Only thoroughly experienced man will be considered. Work in New York City plant.

Write Box 167, Realservice Advtg., 110 W. 34th St., N. Y.

**KNITTER MECHANIC WANTED**

Thoroughly experienced on Kidde 24 bar Lace machines. Must know layout. Permanent position with good opportunity for top man. Please do not apply if not fully capable of setting up and trouble shooting new machines.

**BOX 450N**

**WANTED — SEWING ROOM SUPERVISOR**

Knitting mill in New York City manufacturing ladies' cut and sewn sweaters. Must be capable of training operators and must have finishing and production experience. Year round position.

**BOX 460J**

**KNITTER MECHANIC WANTED**

Experienced on TJI and TAI machines.
Only top rated mechanic need apply.
Give full particulars.
Best opportunity for right man.

**BOX 401**

SERVICES, SUPPLIES FOR SALE

**SAM STARK *specializing in***
**CREATIVE JACQUARD DESIGNS**

60 Clarkson Ave., Brooklyn 26, N. Y. IN 9-8554 Aft. 3 P.M.

POSITIONS WANTED

**PRODUCTION COORDINATOR AND MANAGER AVAILABLE**

with 12 years practical mill and large jobber experience in production planning, coordinating and general administrative duties.

**BOX 461**

**PRODUCTION MAN-STYLIST AVAILABLE**

with thorough knowledge of cost, yarn, quality control, styling and pattern making.

**BOX 340R**

**PLANT MANAGER**
**PRODUCTION COORDINATOR AVAILABLE**

Ladies', men's and boys' sweaters. Can take complete charge. Formerly in own business.

**BOX 466**

**KNITTER-MECHANIC**
**AVAILABLE**

Experienced
on Raschel machines.

**BOX 468**

YARNS WANTED, FOR SALE

**WE BUY**
**AND SELL**

**ALL TYPES OF KNITTING YARNS**

**WORSTED — ZEPHYR — ORLON**

**COTTON — OTHER SYNTHETICS & BLENDS**

**LEHIGH YARN Co.**

2601 N. HOWARD ST.
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REGENT 9-5457

**WANTED FOR CASH** Worsted · Zephyrs · Synthetics · Cotton

We always carry a large stock of yarns, dyed on cones for immediate use.

CALL EV 8-8277
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Brooklyn 6, N. Y.

CENTURY YARN CO.

**SAM SASKEN**

1441 Broadway
New York 18, N. Y.
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**YARNS BOUGHT and SOLD**

100% Worsteds
Angora
Lamb's Wool
Camel's Hair
Cashmere
Mohair
Zephyr
Fur Blends
Synthetics
Garnetted Orlon
Creslan
Natural
Assorted Colors

## METALLIC YARN WANTED

1/64 to 1/128 width. Supported or unsupported.
Kindly enclose small reeling.

**BOX 405**

## WANTED

**COTTON, WOOL, WORSTED, SYNTHETIC and LOOP YARNS**

**HERMAN KASLOFF**

868 N. Fourth St., Phila. 23, Pa. MArket 7-0997

FOR SALE

**ELASTIC YARN FOR KNITTING**

- All Sizes and Colors

**BEDFORD YARN CO.**
79 Clifton Place
Brooklyn, N. Y.
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## WE BUY SURPLUS KNITTING YARN

Machine and Hand Knitting Sizes

**WALTER McCOOK & SON, INC.**

711 Arch St. Phila. 6, Pa. WAlnut 5-8891

CONTRACT WORK, CONTRACTORS WANTED

## CONTRACT WORK WANTED

Can make cable stitch and intarsia on 7 gauge flat Links machine.

**BOX 460E**

## CONTRACT WORK WANTED

Better full-fashioned men's and ladies' sweaters and shirts, 21 gauge equipment. Top quality workmanship.

**BOX 460C**

## FINISHING WANTED

Suppliers of nationally advertised companies has additional capacity for finishing of any type of bulky knitwear. Prompt, neat delivery.

**BOX 460B**

## CONTRACTORS AND MANUFACTURERS WANTED

Are you tied up in your sewing and finishing departments? We offer prompt and efficient sewing and finishing on all bulkies and sweaters.

**BOX 451**

## CONTRACTORS NEEDED

to make Links or fancy front Ban-Lon interlock shirts. Finished garments or knitting of fronts only.

**BOX 460G**

## CONTRACT WORK WANTED

on 7 gauge Links machines. Complete garments or knitting only.

**BOX 458**

BUSINESS OPPORTUNITIES

## ACTIVE PARTNER WANTED

For small sweater mill, established. Mechanic preferred, or experienced factory production man. Small investment.

**BOX 410A**

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Used motors wanted: 300, 550 rpm's. 3/4 or 1 horsepower. Can be gearhead. Box 469

Knitting Mill For Sale. 17 cut, 30" Philip machine and complete finishing plant. Box 420R

Finishing wanted on all types of knit goods; men's, ladies' and children's garments. Call EVergreen 7-6707

Knitter-Mechanic available. Experienced in all phases of production and designing. Box 461AA

Warp knit trims. Save money large quantity. Send sample. Box 461CC

Production supervisor wanted for knit fabric mill located in South Box 461GG

## SEEKING MERGER

Continental System Worsted Spinning located in New England wants to merge with already well established fine quality knitter — Principals only.

**BOX 450A**

## PRODUCTION FOREMAN

would like to invest 20 years of sweater line experience in a sound business. Only party with capital need reply.

**BOX 460**

CLOSE-OUTS WANTED

## CLOSE-OUTS WANTED

**CASH PAID for surplus stocks of Sweaters and Bathing Suits**

**BERNETTE TEXTILE COMPANY**

101 W. 31 St., New York City BRyant 9-5526-7

## COTTON KNIT FABRICS, CLOSEOUTS WTD.

**Solids, stripes & fancies. Also Orlons, Acrilans, Fleeces, Metallics. Woven piece goods & remnants.** *We pay cash.*

**CHARMKNIT CORP.**

82 Franklin St., New York City WAlker 5-6828

**$$ CASH PAID FOR CLOSEOUTS $$**

SWEATERS — POLO SHIRTS — SPORTSWEAR

Men's, Boys' Girls', Ladies' CALL US FIRST!

**ARNA KNITWEAR, INC.**

1265 B'way, N. Y. 1, N. Y. OR 9-1677

## CLOSEOUTS WANTED

CASH for ladies', men's, children's sweaters, polo shirts, etc.

**METRO**

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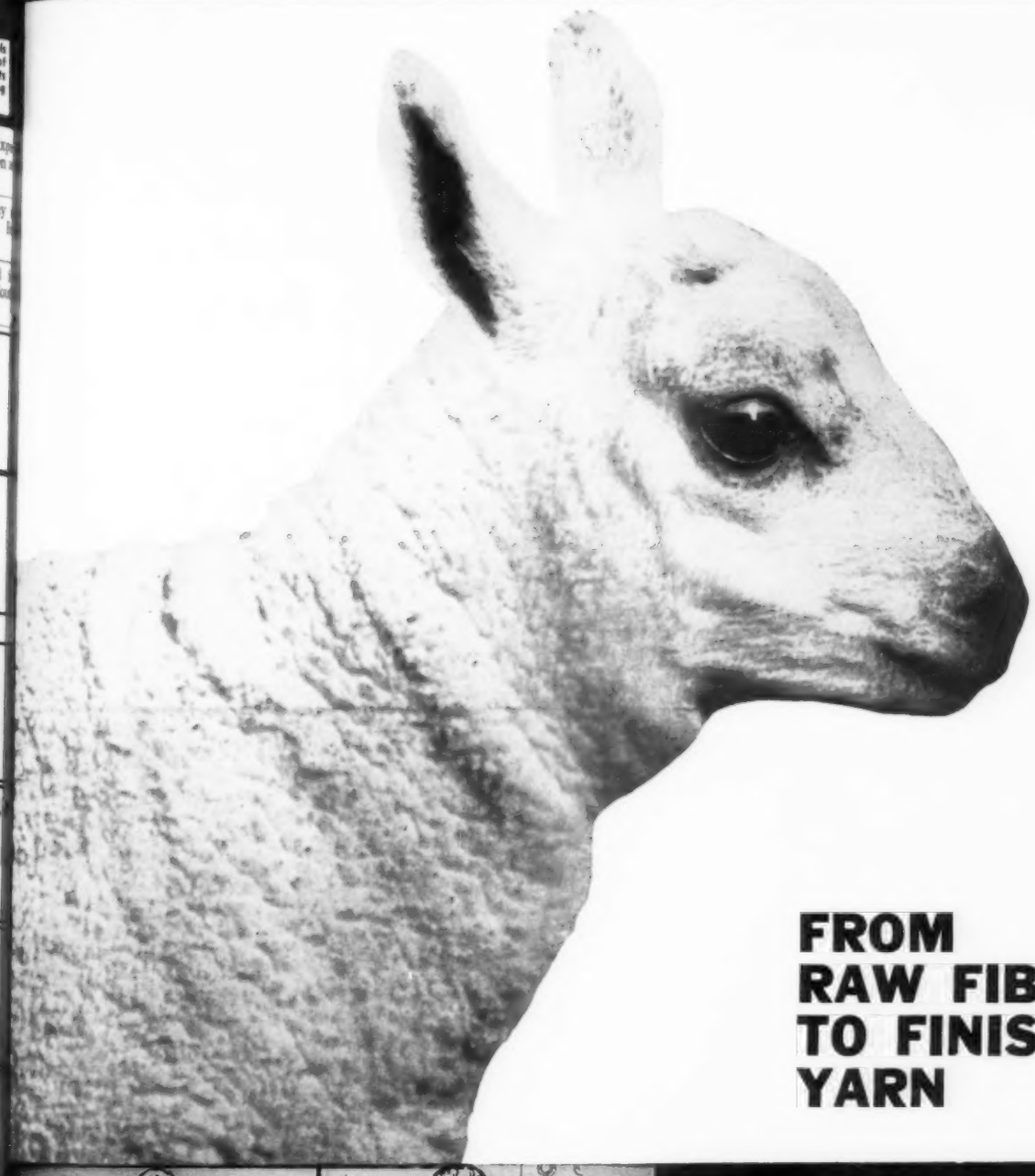
REAL ESTATE

## BUILDING FOR LEASE OR SALE

in upper Manhattan. 10,000 sq. ft. on main floor, 7500 sq. ft. in basement. Sprinkler system. All electrical and air equipment for a knitting mill and offices.

**BOX 450Y**



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## *is the leader in Package Dyeing*
## *ORLON* ®
## *SAYELLE* ®

Naturally, BANNER — famed for its research and development efforts — pioneered in the successful processing of Orlon Sayelle for knitted outerwear — and is now the acknowledged leader.

You are assured of a superior product — from the standpoint of loft, resiliency and uniformity of color.

*progress is our greatest asset!*

GREAT NAMES IN KNITTED OUTERWEAR PROCESSING

4

BANNER YARN DYEING CORPORATION
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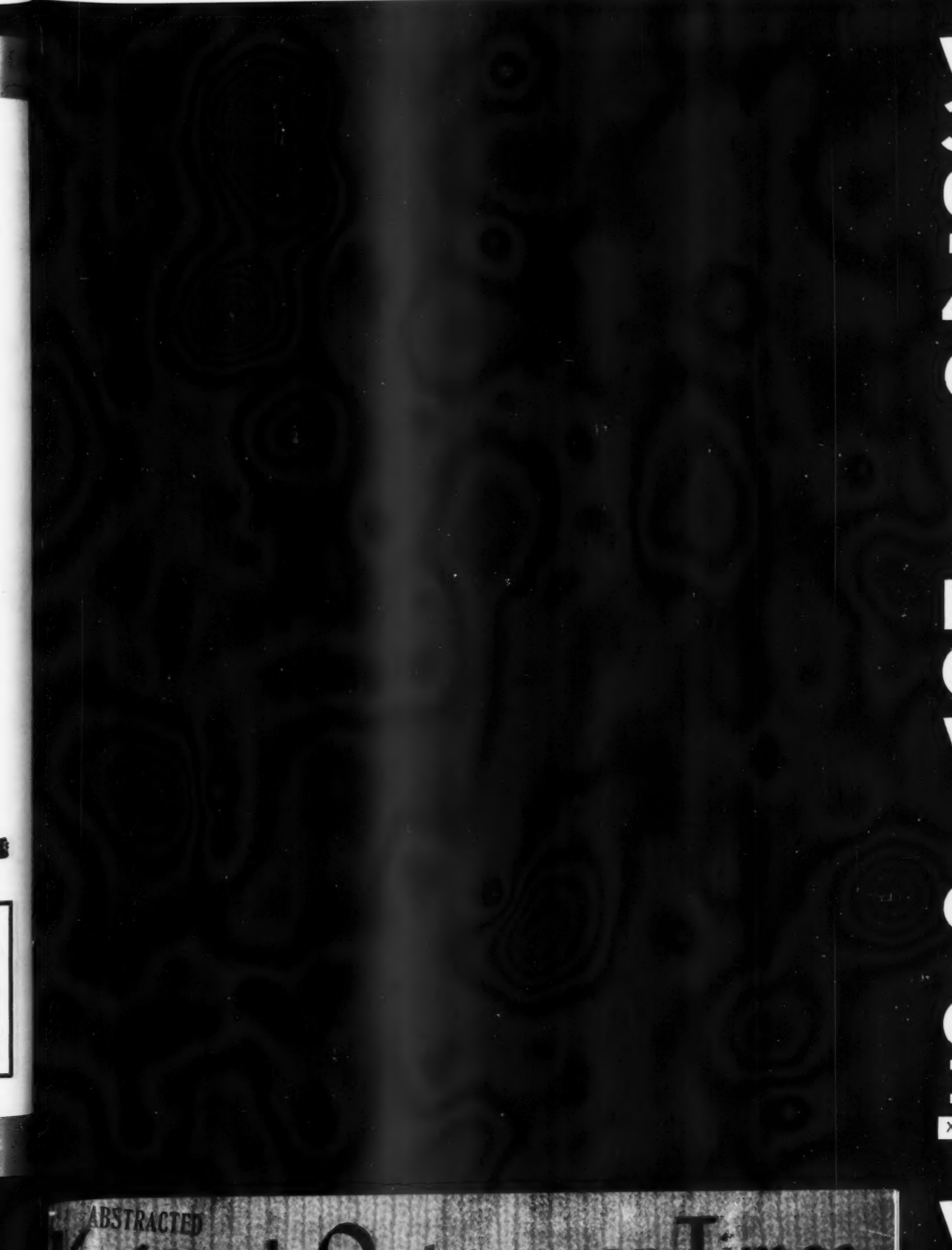
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